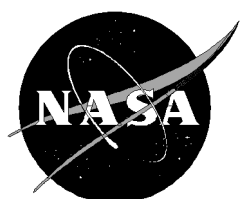


NASA/SP—2002-7039/SUPPL60  
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The citations published in this issue cover the period July 2001 through December 2001. This issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in ascending order.

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|           | Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information, see also <i>34 Fluid Mechanics and Heat Transfer</i> .   |             |
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|           | Includes passenger and cargo air transport operations; and aircraft accidents. For related information, see also <i>16 Space Transportation</i> and <i>85 Urban Technology and Transportation</i> .  |             |
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|           | Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information, see also <i>17 Space Communications, Spacecraft Communications, Command and Tracking</i> and <i>32 Communications Radar</i> .                           |             |
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| <b>09</b> | <b>Research and Support Facilities (Air)</b>   | <b>N.A.</b> |
|           | Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information, see also <i>14 Ground Support Systems and Facilities (Space)</i> .   |             |

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- 13    Astrodynamics    N.A.**  
Includes powered and free-flight trajectories; and orbital and launching dynamics.
- 14    Ground Support Systems and Facilities (Space)    N.A.**  
Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. *For related information, see also 09 Research and Support Facilities (Air).*
- 15    Launch Vehicles and Space Vehicles    5**  
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- 16    Space Transportation    N.A.**  
Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. *For related information, see also 03 Air Transportation and Safety and 18 Spacecraft Design, Testing and Performance. For space suits, see 54 Man/System Technology and Life Support.*
- 17    Space Communications, Spacecraft Communications, Command and Tracking    6**  
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- 18    Spacecraft Design, Testing and Performance    N.A.**  
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- 28 Propellants and Fuels 13**  
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- 29 Materials Processing N.A.**  
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- 33     Electronics and Electrical Engineering     17**
- Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.
- 34     Fluid Mechanics and Heat Transfer     N.A.**
- Includes boundary layers; hydrodynamics; fluidics; mass transfer and ablation cooling. For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.
- 35     Instrumentation and Photography     25**
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- 36     Lasers and Masers     29**
- Includes parametric amplifiers. For related information see also *76 Solid-State Physics*.
- 37     Mechanical Engineering     29**
- Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.
- 38     Quality Assurance and Reliability     N.A.**
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- 44     Energy Production and Conversion     N.A.**
- Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also *07 Aircraft Propulsion and Power*, *20 Spacecraft Propulsion and Power*, and *28 Propellants and Fuels*.

<b>45</b>	<b>Environment Pollution</b>	<b>N.A.</b>
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<b>46</b>	<b>Geophysics</b>	<b>N.A.</b>
	Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism. For space radiation see <i>93 Space Radiation</i> .	
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- 76 Solid-State Physics** **N.A.**  
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- 91 Lunar and Planetary Exploration** **N.A.**  
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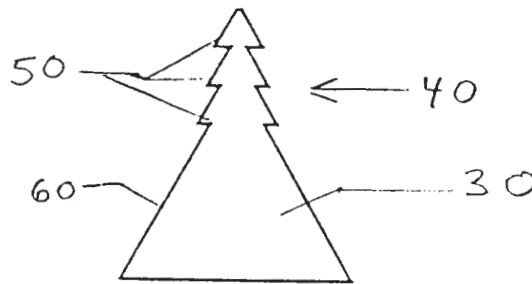
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# Typical Report Citation and Abstract

- ❶ 19970011223 NASA Langley Research Center, Hampton, VA USA
- ❷ **Serrated-Planform Lifting-Surfaces**
- ❸ McGrath, Brian E., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research
- ❹ Center, USA; Oct. 22, 1996; 38p; In English
- ❺ Patent Info.: Filed 22 Oct. 1996; NASA-Case-LAR-15295-1; US-Patent-Appl-SN-734820
- ❻ Report No.(s): NAS 1.71:LAR-15295-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
- ❼ A set of serrated-planform lifting surfaces is provided which produces unexpectedly high lift coefficients at moderate to high angles-of-attack. Each serration, or tooth, is designed to shed a vortex. The interaction of the vortices greatly enhances the lifting capability over an extremely large operating range. Variations of the invention use serrated-planform lifting surfaces in planes different than that of a primary lifting surface. In an alternate embodiment, the individual teeth are controllably retractable and deployable to provide for active control of the vortex system and hence lift coefficient. Differential lift on multiple serrated-planform lifting surfaces provides an means for vehicle control. The important aerodynamic advantages of the serrated-planform lifting surfaces are not limited to aircraft applications but can be used to establish desirable performance characteristics for missiles, land vehicles, and/or watercraft.
- ❽ NASA
- ❾ *Angle of Attack; Lift; Vortex Shedding; Active Control; Lifting Bodies*

❿



## Key

1. Document ID Number; Corporate Source
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JANUARY 2002

## 02 AERODYNAMICS

*Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information see also 34 Fluid Mechanics and Heat Transfer.*

**20010110771** NASA Langley Research Center, Hampton, VA USA

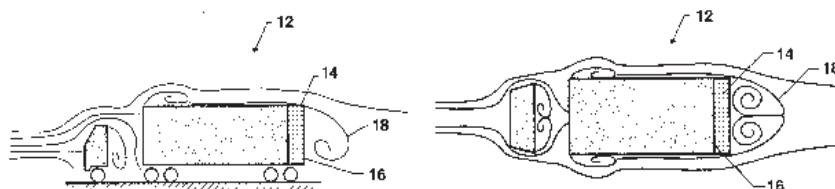
### **Base Passive Porosity for Drag Reduction**

Bauer, Steve X. S., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research Center, USA; Sep. 11, 2001; 8p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-327061, filed 19 Oct. 1994 Patent Info.: Filed 1 Nov. 1996; NASA-Case-LAR-15601-1; US-Patent-6,286,892; US-Patent-Appl-SN-744414; US-Patent-Appl-SN-327061; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A device for controlling drag on a ground vehicle is presented. The device consists of a porous skin mounted on the trailing surface of the ground vehicle. The porous skin may be separated from the vehicle surface by a distance of at least the thickness of the porous skin. Alternately, the trailing surface of the ground vehicle may be porous. The device minimizes the strength of the separation in the base and wake regions of the ground vehicle, thus reducing drag.

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*Drag Reduction; Porosity; Mechanical Devices; Base Flow*



## 04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

*Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also 17 Space Communications, Spacecraft Communications, Command and Tracking and 32 Communications and Radar.*

**20010110772** NASA Goddard Space Flight Center, Greenbelt, MD USA

### **Global Positioning System Satellite Selection Method**

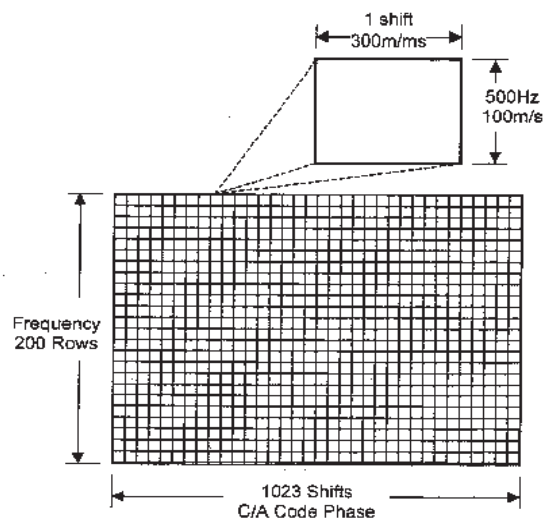
Niles, Frederick A., Inventor, NASA Goddard Space Flight Center, USA; Aug. 21, 2001; 32p; In English; Provisional application of US-Patent-Appl-SN-092491, filed 8 Jul. 1998

Patent Info.: Filed 7 Jul. 1999; NASA-Case-GSC-13991-2; US-Patent-6,278,404; US-Patent-Appl-SN-348875; US- Patent-Appl-SN-092491; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The satellite selection method as utilized by the spaceborne Global Positioning System receiver provides navigational solutions and is designed for use in low Earth orbit. The satellite selection method is a robust algorithm that can be used a GPS receiver to select appropriate GPS satellites for use in calculating point solutions or attitude solutions. The method is takes into account the difficulty of finding a particular GPS satellite phase code, especially when the search range in greatly increased due to Doppler shifts introduced into the carrier frequency. The method starts with an update of the antenna pointing and spacecraft vectors to determine the antenna backplane direction. Next, the GPS satellites that will potentially be in view of the antenna are ranked on a list, whereby the list is generated based on the estimated attitude and position of each GPS satellite. Satellites blocked by the Earth are not entered on this list. A second list is created, whereby the GPS satellites are ranked according to their desirability for use in attitude determination. GPS satellites are ranked according to their orthogonality to the antenna backplane, and according to geometric dilution of precision considerations. After the lists are created, the channels of the spaceborne GPS receiver are assigned to various GPS satellites for acquisition and lock. Preliminary Doppler frequencies for searching are assigned to the various channels.

Official Gazette of the U.S. Patent and Trademark Office

*Global Positioning System; Navigation Satellites; Receivers; Attitude (Inclination)*



## 06

### AVIONICS AND AIRCRAFT INSTRUMENTATION

**20010095541** NASA Johnson Space Center, Houston, TX USA

#### **Moving Object Control System**

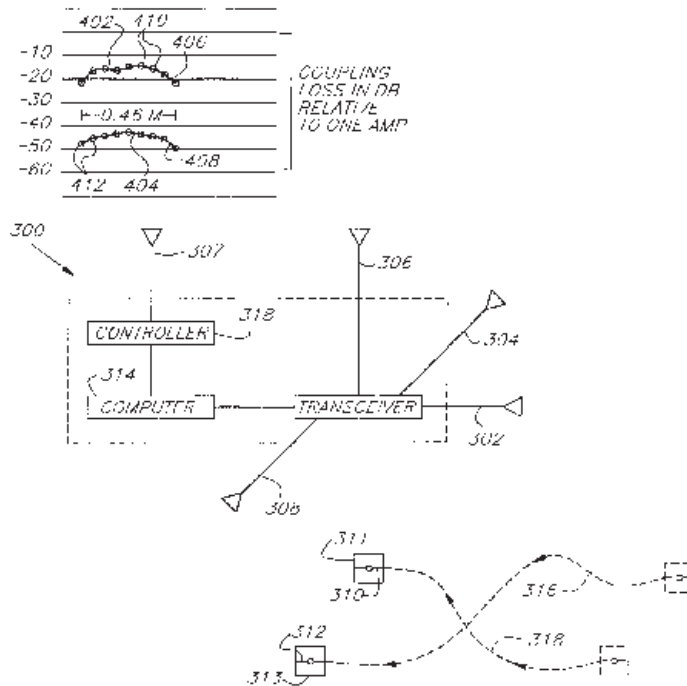
Arndt, G. Dickey, Inventor, NASA Johnson Space Center, USA; Carl, James R., Inventor, NASA Johnson Space Center, USA; Jun. 26, 2001; 16p; In English; Division of US-Patent-Appl-SN-944040, filed 29 Sep. 1997

Patent Info.: Filed 24 Mar. 2000; NASA-Case-MSC-22743-3; US-Patent-6,252,396; US-Patent-Appl-SN-535669; US-Patent-Appl-SN-944040; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method is provided for controlling two objects relatively moveable with respect to each other. A plurality of receivers are provided for detecting a distinctive microwave signal from each of the objects and measuring the phase thereof with respect to a reference signal. The measured phase signal is used to determine a distance between each of the objects and each of the plurality of receivers. Control signals produced in response to the relative distances are used to control the position of the two objects.

Official Gazette of the U.S. Patent and Trademark Office

*Microwaves; Receivers; Control; Position (Location)*



07

## AIRCRAFT PROPULSION AND POWER

*Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information see also 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels, and 44 Energy Production and Conversion.*

**20010098603** NASA Glenn Research Center, Cleveland, OH USA

### Reduced Toxicity Fuel Satellite Propulsion System

Schneider, Steven J., Inventor, NASA Glenn Research Center, USA; Aug. 14, 2001; 30p; In English

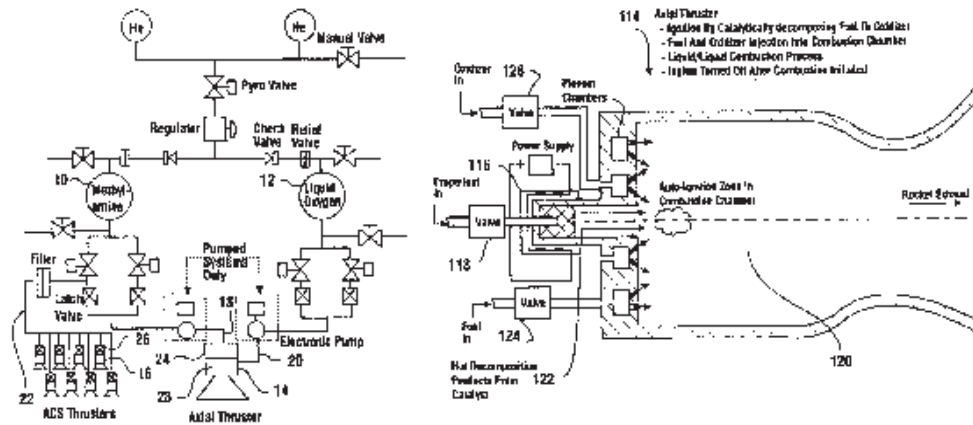
Patent Info.: Filed 14 Apr. 1999; NASA-Case-LEW-16636-1; US-Patent-6,272,846; US-Patent-Appl-SN-291883; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A reduced toxicity fuel satellite propulsion system including a reduced toxicity propellant supply for consumption in an axial class thruster and an ACS class thruster. The system includes suitable valves and conduits for supplying the reduced toxicity propellant to the ACS decomposing element of an ACS thruster. The ACS decomposing element is operative to decompose the reduced toxicity propellant into hot propulsive gases. In addition the system includes suitable valves and conduits for supplying the reduced toxicity propellant to an axial decomposing element of the axial thruster. The axial decomposing element is operative to decompose the reduced toxicity propellant into hot gases. The system further includes suitable valves and conduits for supplying

a second propellant to a combustion chamber of the axial thruster, whereby the hot gases and the second propellant auto-ignite and begin the combustion process for producing thrust.

Author

*Toxicity; Spacecraft Propulsion; Decomposition; Propellant Combustion; Propellant Consumption; Fuel Systems; Rocket Oxidizers; Propulsion System Configurations*



## 13 ASTRODYNAMICS

*Includes powered and free-flight trajectories; and orbital and launching dynamics.*

**20010110769** NASA Goddard Space Flight Center, Greenbelt, MD USA

### **Method and Apparatus for Determining Position Using Global Positioning Satellites**

Ward, John L., Inventor, NASA Goddard Space Flight Center, USA; Jan. 30, 2001; 12p; In English; Continuation-in-part of US-Patent-Appl-SN-627817, filed 1 Apr. 1996

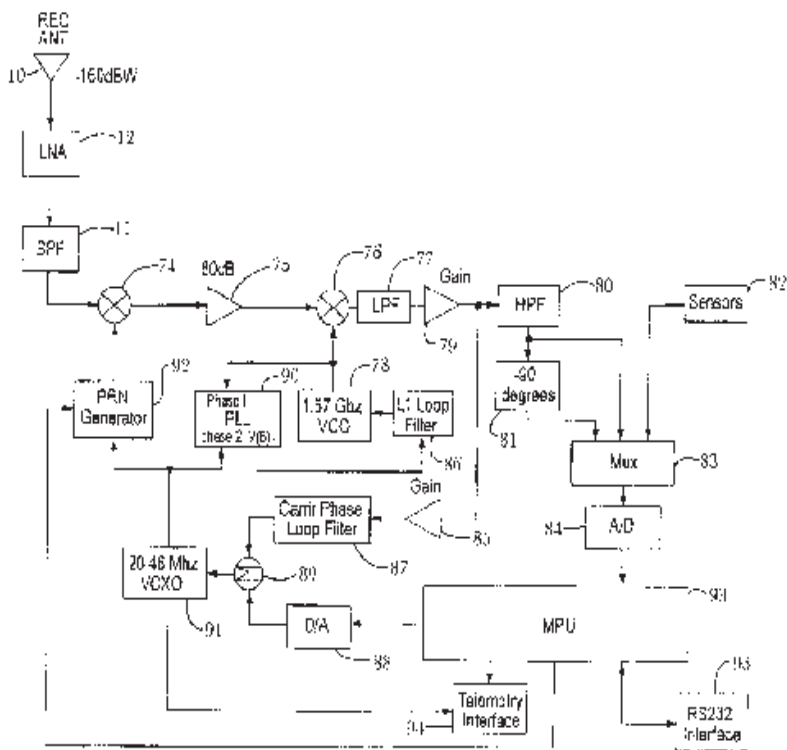
Patent Info.: Filed 10 Aug. 1998; NASA-Case-GSC-13939-1; US-Patent-6,182,011; US-Patent-Appl-SN-131704; US-Patent-Appl-SN-627817; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A global positioning satellite receiver having an antenna for receiving a L1 signal from a satellite is presented. The L1 signal is processed by a preamplifier stage including a band pass filter and a low noise amplifier and output as a radio frequency (RF) signal. A mixer receives and de-spreads the RF signal in response to a pseudo-random noise code, i.e., Gold code, generated by an internal pseudo-random noise code generator. A microprocessor enters a code tracking loop, such that during the code tracking loop, it addresses the pseudorandom code generator to cause the pseudo-random code generator to sequentially output pseudo-random codes corresponding to satellite codes used to spread the L1 signal, until correlation occurs. When an output of the mixer is indicative of the occurrence of correlation between the RF signal and the generated pseudo-random codes, the microprocessor caters an operational state which slows the receiver code sequence to stay locked with the satellite code sequence. The output of the mixer is provided to a detector which, in turn, controls certain routines of the microprocessor. The microprocessor will output pseudo range information according to an interrupt routine in response detection of correlation. The

pseudo range information is to be telemetered to a ground station which determines the position of the global positioning satellite receiver.

Official Gazette of the U.S. Patent and Trademark Office

*Telemetry; Global Positioning System; Preamplifiers; Microprocessors*



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## LAUNCH VEHICLES AND LAUNCH OPERATIONS

**20010125604** NASA Marshall Space Flight Center, Huntsville, AL USA

### Pressure-Driven Magnetically-Coupled Conveyance

Robertson, Glen A., Inventor, NASA Marshall Space Flight Center, USA; Jan. 09, 2001; 8p; In English

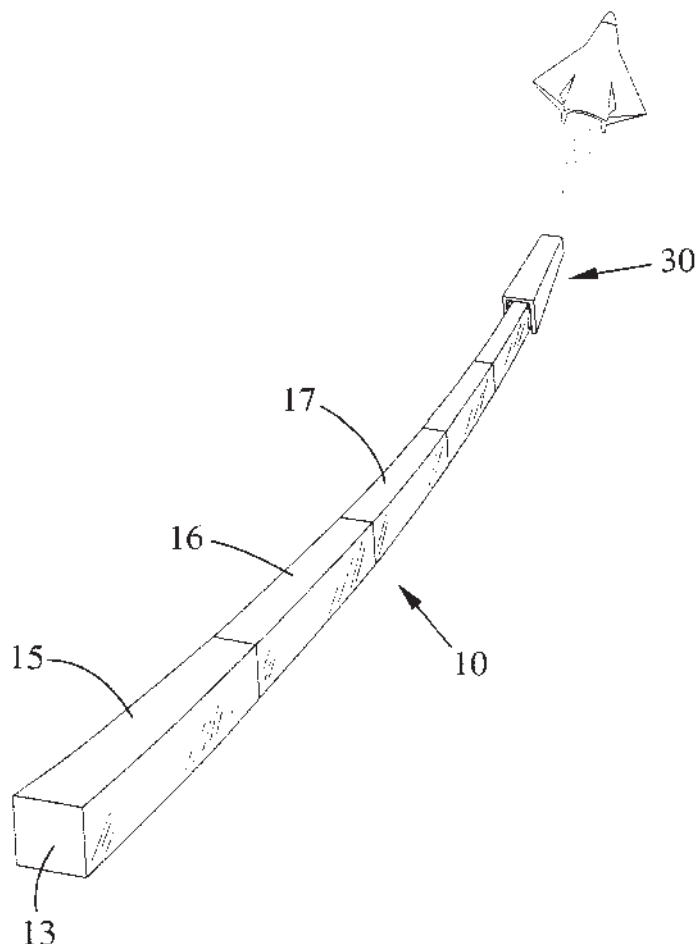
Patent Info.: Filed 18 Dec. 1998; NASA-Case-MFS-31184-1; US-Patent-6,170,404; US-Patent-Appl-SN-216492; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This invention has the ability to provide the initial acceleration necessary for spacecraft to attain earth orbit without use of traditional rocket propellants. The invention also has the ability to provide an alternative means of ground transportation without the direct use of fossil fuel. The invention 6 utilizes a pressurized, nonmagnetic tube to accelerate and translate a piston. The piston

is magnetically coupled to a conveyance, which travels along the outside of the tube. The conveyance, in turn, can be either a spacecraft or a vehicle suitable for ground transportation.

Official Gazette of the U.S. Patent and Trademark Office

*Fossil Fuels; Rocket Propellants; Surface Vehicles; Acceleration (Physics)*



17

## SPACE COMMUNICATIONS, SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

*Includes telemetry; space communications networks; astronavigation and guidance; and radio blackout. For related information see also 04 Aircraft Communications and Navigation and 32 Communications and Radar.*

**20010117890** NASA Goddard Space Flight Center, Greenbelt, MD USA

### **Spaceborne Global Positioning System for Spacecraft**

Dougherty, Lamar F., Inventor, NASA Goddard Space Flight Center, USA; Niles, Frederick A., Inventor, NASA Goddard Space Flight Center, USA; Wennersten, Miriam D., Inventor, NASA Goddard Space Flight Center, USA; Apr. 03, 2001; 28p; In English; Provisional application of US-Patent-Appl-SN-092491, filed 8 Jul. 1998

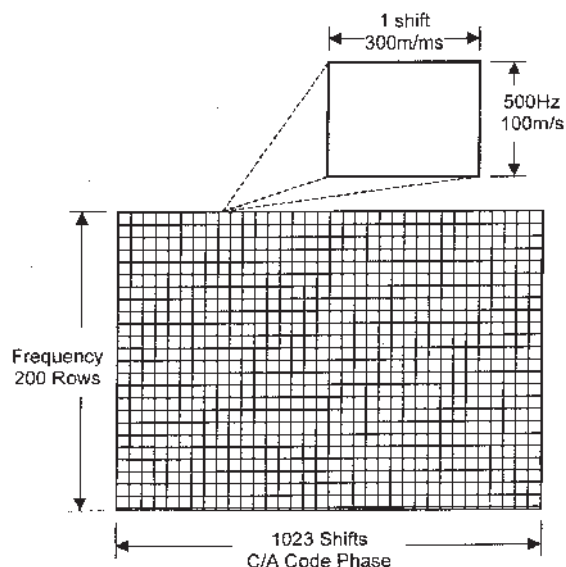
Patent Info.: Filed 7 Jul. 1999; NASA-Case-GSC-13991-1; US-Patent-6,211,822; US-Patent-Appl-SN-348876; US-Patent-Appl-SN-092491; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The spaceborne Global Positioning System receiver provides navigational solutions and is designed for use in low Earth orbit. The spaceborne GPS receiver can determine the orbital position of a spacecraft using any of the satellites within the GPS constellation. It is a multiple processor system incorporating redundancy by using a microcontroller to handle the closure of

tracking loops for acquired GPS satellites, while a separate microprocessor computes the spacecraft navigational solution and handles other tasks within the receiver. The spaceborne GPS receiver can use either microcontroller or the microprocessor to close the satellite tracking loops. The use of microcontroller provides better tracking performance of acquired GPS satellites. The spaceborne GPS receiver utilizes up to seven separate GPS boards, with each board including its own set of correlators, down-converters and front-end components. The spaceborne GPS receiver also includes telemetry and time-marking circuitry. The spaceborne GPS receiver communicates with other spacecraft systems through a variety of interfaces and can be software-configured to support several different mission profiles.

Official Gazette of the U.S. Patent and Trademark Office

*Global Positioning System; Navigation Satellites; Satellite Tracking; Low Earth Orbits*



*For related information see also 06 Aircraft Instrumentation and 35 Instrumentation and Photography. and Astrionics*

**20010125600** NASA Dryden Flight Research Center, Edwards, CA USA

### **Wind Advisory System**

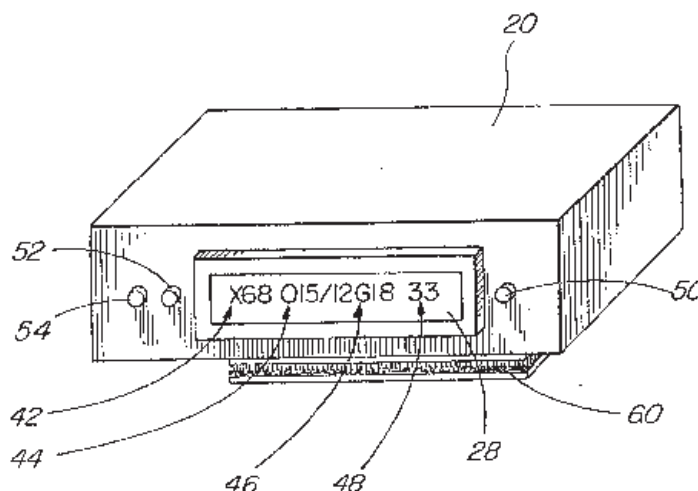
Curto, Paul A., Inventor, NASA Dryden Flight Research Center, USA; Brown, Gerald E., Inventor, NASA Dryden Flight Research Center, USA; Zysko, Jan A., Inventor, NASA Dryden Flight Research Center, USA; Oct. 30, 2001; 8p; In English Patent Info.: NASA-Case-DRC-09901-6; US-Patent-6,311,107; US-Patent-Appl-SN-606102; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The present invention is a two-part wind advisory system comprising a ground station at an airfield and an airborne unit placed inside an aircraft. The ground station monitors wind conditions (wind speed, wind direction, and wind gust) at the airfield and transmits the wind conditions and an airfield ID to the airborne unit. The airborne unit identifies the airfield by comparing the received airfield ID with airfield IDs stored in a database. The airborne unit also calculates the headwind and crosswind for each runway in both directions at the airfield using the received wind conditions and runway information stored in the database. The airborne unit then determines a recommended runway for takeoff and landing operations of the aircraft based on the runway having the greatest headwind value and displays the airfield ID, wind conditions, and recommended runway to the pilot. Another

embodiment of the present invention includes a wireless internet based airborne unit in which the airborne unit can receive the wind conditions from the ground station over the internet.

Official Gazette of the U.S. Patent and Trademark Office

*Airports; Wind Velocity; Wind Direction; Monitors; Display Devices*



## 20

### SPACECRAFT PROPULSION AND POWER

*Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.*

**20010125613** NASA Marshall Space Flight Center, Huntsville, AL USA

#### **Low-Cost Gas Generator and Ignitor**

Dennis, Henry J., Jr., Inventor, NASA Marshall Space Flight Center, USA; Hissam, D. Andy, Inventor, NASA Marshall Space Flight Center, USA; Myers, W. Neill, Inventor, NASA Marshall Space Flight Center, USA; Taylor, Eric S., Inventor, NASA Marshall Space Flight Center, USA; Feb. 20, 2001; 6p; In English

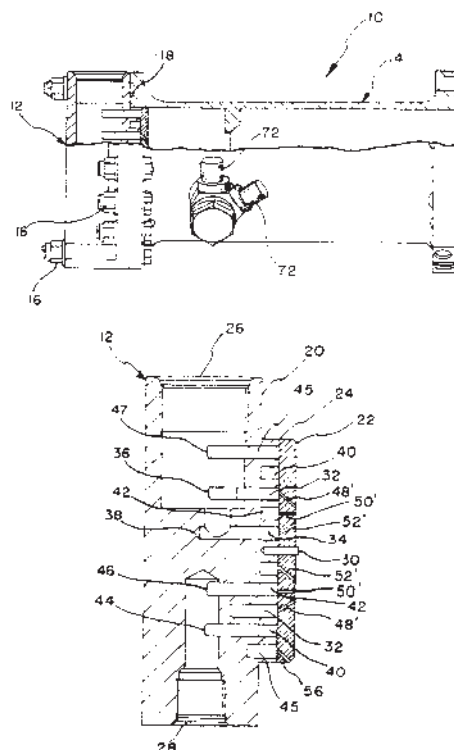
Patent Info.: Filed 18 Jun. 1999; NASA-Case-MFS-31343-1; US-Patent-6,189,315; US-Patent-Appl-SN-350412; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A gas generator and ignitor assembly for powering a turbine of a turbopump assembly for a rocket engine comprises an injector and a combustion chamber. the injector having a body member including a fuel inlet and an oxidizer inlet spaced one from the other and communicating with respective radially spaced apart annular members in the body member. Three annuli communicate with the fuel inlet and two annuli communicate with the oxidizer inlet. the annuli which communicates with the oxidizer being positioned between pairs of the other annuli. The body member is enclosed by a plate having an array of bores arranged in two series with three radially spaced apart groups of circular rows in each series. The outer series has 28 groups of triplet bores while the inner series has 14 groups of triplet bores. The annuli which communicate with oxidizer feed bores of each series that are between the other bores of a triplet. the latter bores communicating with annuli that communicate with fuel. The inner and outer bores of the triplets of each series are inclined relatively to each other and to the third bore of the triplet so that fuel and oxidizer atomizes as it is sprayed into the inlet of the combustion chamber where the propellants are mixed. and burned.

The burning of the propellants is effected by ignition of a plug of solid propellant fuel mounted to communicate with the interior of the combustion chamber.

Official Gazette of the U.S. Patent and Trademark Office

*Gas Generators; Ignition; Turbine Pumps; Annuli*



## 24

### COMPOSITE MATERIALS

*Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.*

**20010125599** NASA Marshall Space Flight Center, Huntsville, AL USA

#### **Composite Tank**

DeLay, Thomas K., Inventor, NASA Marshall Space Flight Center, USA; Dec. 12, 2000; 4p; In English

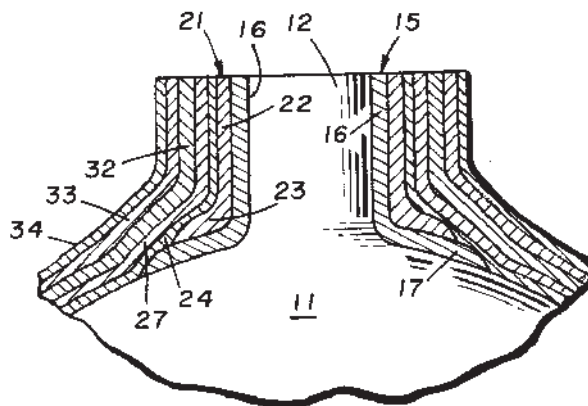
Patent Info.: Filed 22 Dec. 1998; NASA-Case-MFS-31379-1; US-Patent-6,158,605; US-Patent-Appl-SN-218652; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A composite tank for containing liquid oxygen and the method of making the same Wherein a water-soluble mandrel having ing the desired tank configuration and a cylindrical protuberance on at least one end is fitted with an inner boss conformance, to the configuration of the mandrel and in outer boss conforming to the configuration of the inner boss, the bosses each having a tubular portion for receiving the protuberance on the mandrel and a spherical portion. The mandrel and the bosses are first coated with a nickel coating. The mandrel is then wrapped with graphite fibers wetted with an epoxy resin and this resin is cured. A layer of insulating foam is then applied to the tank and cured. The insulating foam is machined to a desired concentration and a layer

of aramid fibers wetted with a second epoxy resin is wrapped around the tank. The second resin is cured and the water soluble mandrel is washed from inside the tank.

Official Gazette of the U.S. Patent and Trademark Office

*Liquid Oxygen; Tanks (Containers)*



25

## INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

**20010097897** NASA Glenn Research Center, Cleveland, OH USA

### **Polyimides and Process for Preparing Polyimides Having Thermal-Oxidative Stability**

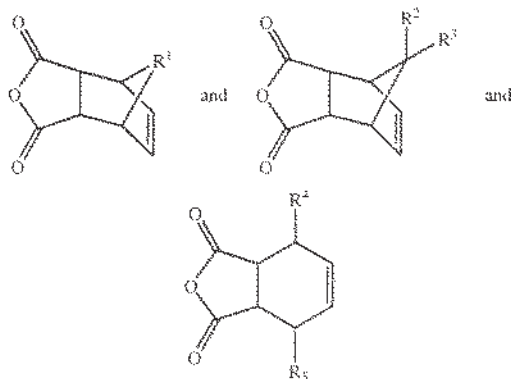
Meador, Mary Ann B., Inventor, NASA Glenn Research Center, USA; Aug. 14, 2001; 22p; In English

Patent Info.: Filed 23 Mar. 2000; NASA-Case-LEW-17012-1; US-Patent-6,274,699; US-Patent-Appl-SN-538593; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Polyimides and the process for preparing polyimides having improved thermal-oxidative stability derived from the polymerization of effective amounts of one or more of the polyamines such as the aromatic diamines, one or more of the tetracarboxylic dianhydrides and a novel dicarboxylic endcap having formula with an R1 group of either hydrogen or an alkyl radical of one to four carbons, an R2 group of either OH, NH2, F, or Cl radical, an R3 group of either H, OH, NH2, F, Cl or an alkylene radical, an R4 group of either an alkyl, aryl, aryloxy, nitro, F, or Cl radical, and/or an R5 group of either H, alkyl, aryl, alkoxy, aryloxy, nitro, F, or Cl radical. The polyimides are useful particularly in the preparation of prepegs and PMR composites.

Official Gazette of the U.S. Patent and Trademark Office

*Polyimides; Thermal Stability; Polymerization; Diamines; Anhydrides; Dicarboxylic Acids; Organic Chemistry*



## METALS AND METALLIC MATERIALS

**20010097904** NASA Johnson Space Center, Houston, TX USA

**Vapor Corrosion Cell and Method of Using Same**

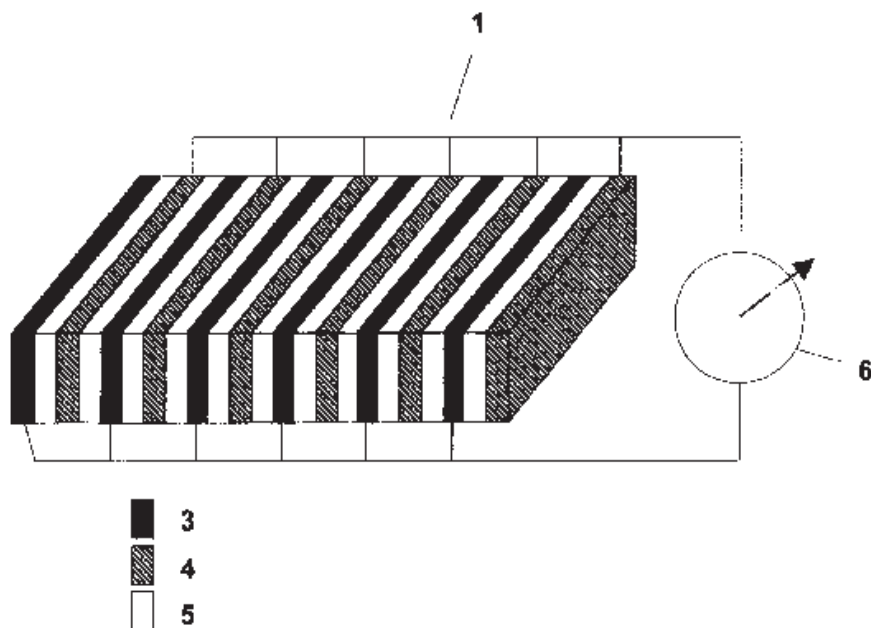
Davis, Dennis D., Inventor, NASA Johnson Space Center, USA; Jul. 10, 2001; 8p; In English

Patent Info.: Filed 15 Apr. 1999; NASA-Case-MS-C-22871-1; US-Patent-6,258,253; US-Patent-Appl-SN-292237; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The present invention provides a vapor corrosion cell for a real-time and quantitative measurement of corrosion of conductive materials in atmospheres containing chemically reactive gases and water vapor. Two prototypes are provided. Also provided are various applications of this apparatus in industry.

Official Gazette of the U.S. Patent and Trademark Office

*Corrosion; Water Vapor; Gases; Prototypes; Electrochemistry; Real Time Operation; Gas-Metal Interactions*



**20010110765** NASA Glenn Research Center, Cleveland, OH USA

**Shape Memory Alloy Actuator**

Baumbick, Robert J., Inventor, NASA Glenn Research Center, USA; Nov. 28, 2000; 7p; In English

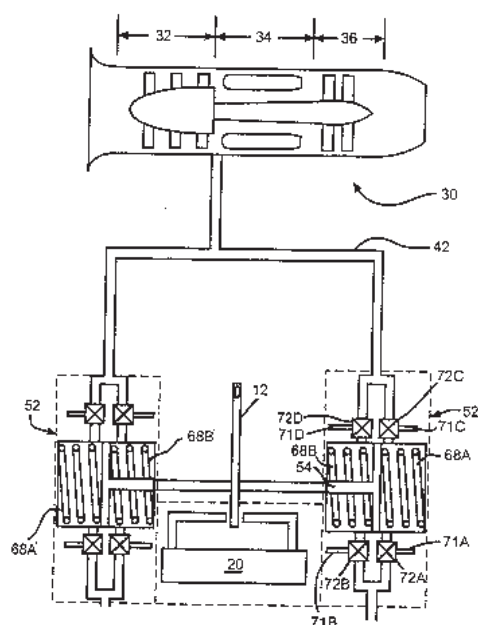
Patent Info.: Filed 6 Apr. 1999; NASA-Case-LEW-16685-1; US-Patent-6,151,897; US-Patent-Appl-SN-286877; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The present invention discloses and teaches a unique, remote optically controlled micro actuator particularly suitable for aerospace vehicle applications wherein hot gas, or in the alternative optical energy, is employed as the medium by which shape

memory alloy elements are activated. In gas turbine powered aircraft the source of the hot gas may be the turbine engine compressor or turbine sections.

Official Gazette of the U.S. Patent and Trademark Office

*Actuators; Aerospace Vehicles; Shape Memory Alloys; Remote Control*



27

## NONMETALLIC MATERIALS

*Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.*

**20010073954** NASA Langley Research Center, Hampton, VA USA

### **Reflective Self-Metallizing Polyimide Films**

Thompson, David W., Inventor, NASA Langley Research Center, USA; Caplan, Maggie L., Inventor, NASA Langley Research Center, USA; St.Clair, Anne, Inventor, NASA Langley Research Center, USA; Oct. 14, 1997; 5p; In English

Patent Info.: Filed 14 Jun. 1995; NASA-Case-LAR-15272-1; US-Patent-5,677,418; US-Patent-Appl-SN-490290; No Copyright;

Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A silver organic complex, such as silver acetate, is solubilized in a polyamic acid resin or soluble polyimide solution using a suitable solvent such as hexafluoroacetyl acetone. The mixture is stable and can be applied to both flat and contoured surfaces. Application can be performed by casting, dip-coating, spraying, or other suitable techniques. In addition, the mixture can be cast or extruded as a polyimide film which is not applied to an underlying substrate. Upon curing, a flexible silver coated polyimide film is produced.

Official Gazette of the U.S. Patent and Trademark

*Polyimides; Polymeric Films; Reflectance; Thermal Stability; Abrasion Resistance*

**20010094779** NASA Glenn Research Center, Cleveland, OH USA

### **Triamine-Modified Polyimides Having Improved Processability and Low Melt Flow Viscosity**

Meador, Michael A., Inventor, NASA Glenn Research Center, USA; Nguyen, Baochan N., Inventor, NASA Glenn Research Center, USA; Eby, Ronald K., Inventor, NASA Glenn Research Center, USA; Jul. 17, 2001; 19p; In English; Provisional

US-Patent-Appl-SN-118479, filed 3 Feb. 1999

Patent Info.: Filed 1 Feb. 2000; NASA-Case-LEW-16968-1; US-Patent-6,262,223; US-Patent-Appl-SN-495599; US-Patent-Appl-SN-118479; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Addition-cured polyimides that contain the reaction product of an aromatic triamine or trianhydride analogue thereof, a reactive end group such as 5-norbornene-2, 3-dicarboxylic acid, ester derivatives of 5-norbornene-2, 3-dicarboxylic acid, anhydride derivatives of 5-norbornene-2, 3-dicarboxylic acid, or 4-phenylethynylphthalic anhydride, an aromatic diamine, and a dialkyl ester of an aromatic tetracarboxylic acid. The resultant starlike polyimides; exhibit lower melt flow viscosity than its linear counterparts, providing for improved processability of the polyimide. Also disclosed are methods for the synthesis of these polyimides as well as composite structures formed using these polyimides.

Author

*Composite Structures; Diamines; Polyimides; Production Engineering*

**20010111095** NASA Glenn Research Center, Cleveland, OH USA

**Polyimides and Process For Preparing Polyimides Having Improved Thermal-Oxidative Stability**

Meador, Mary Ann B., Inventor, NASA Glenn Research Center, USA; Frimer, Aryeh A., Inventor, NASA Glenn Research Center, USA; Oct. 16, 2001; 12p; In English

Patent Info.: Filed 23 Mar. 2000; NASA-Case-LEW-16987-1; US-Patent-6,303,744; US-Patent-Appl-SN-535663; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Polyimides and the process for preparing polyimides having improved thermal-oxidative stability derived from the polymerization of effective amounts of one or more of the polyamines such as the aromatic diamines, one or more of the tetracarboxylic dianhydrides and a novel dicarboxylic endcap having formula with an R1 group of either hydrogen or an alkyl radical of one to four carbons, an R2 group of either OH, NH2, F, or Cl radical, an R3 group of either H, OH, NH2, F, Cl or an alkylene radical, an R4 group of either an alkyl, aryl, aryloxy, nitro, F, or Cl radical, and/or an R5 group of either H, alkyl, aryl, alkoxy, aryloxy, nitro, F, or Cl radical. The polyimides are useful particularly in the preparation of prepegs and PMR composites. Official Gazette of the U.S. Patent and Trademark Office

*Polyimides; Thermal Stability; Polymerization; Diamines; Anhydrides; Dicarboxylic Acids; Organic Chemistry*

**20010111101** NASA Langley Research Center, Hampton, VA USA

**Method to Prepare Processable Polyimides With Reactive Endgroups Using 1,3-bis(3-aminophenoxy)benzene**

Jensen, Brian J., Inventor, NASA Langley Research Center, USA; Sep. 11, 2001; 12p; In English; Continuation of US-Patent-Appl-SN-342462, filed 29 Jun. 1999 which is a provisional of US-Patent-Appl-SN-090990, filed 29 Jun. 1998

Patent Info.: Filed 21 Sep. 2000; NASA-Case-LAR-15449; US-Patent-6,288,209; US-Patent-Appl-SN-667426; US-Patent-Appl-SN-342462; US-Patent-Appl-SN-090990; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Polyimide copolymers were obtained containing 1,3-bis(3-aminophenoxy)benzene (APB) and other diamines and dianhydrides and terminating with the appropriate amount of a non-reactive endcapper, such as phthalic anhydride. Homopolymers containing only other diamines and dianhydrides which are not processable under conditions described previously can be made processable by incorporating various amounts of APB, depending on the chemical structures of the diamines and dianhydrides used. Polyimides that are more rigid in nature require more APB to impart processability than polyimides that are less rigid in nature. The copolymers that result from using APB to enhance processability have a unique combination of properties including excellent thin film properties, low pressure processing (200 psi and below), improved toughness, improved solvent resistance, improved adhesive properties, improved composite mechanical properties, long term melt stability (several hours at 390 C), and lower melt viscosities.

Official Gazette of the U.S. Patent and Trademark Office

*Polyimides; Copolymers; Anhydrides; Benzene*

## 28

### PROPELLANTS AND FUELS

*Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.*

**20010125605** NASA Glenn Research Center, Cleveland, OH USA

**Reduced Toxicity Fuel Satellite Propulsion System Including Axial Thruster and ACS Thruster Combination**

Schneider, Steven J., Inventor, NASA Glenn Research Center, USA; Nov. 06, 2001; 30p; In English; Division of US-Patent-

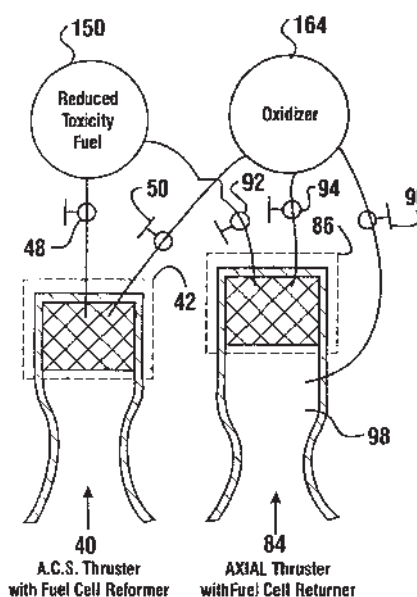
Appl-SN-291883, filed 14 Apr. 1999

Patent Info.: Filed 17 Apr. 2001; NASA-Case-LEW-16636-5; US-Patent-6,311,477; US-Patent-Appl-SN-837820; US-Patent-Appl-SN-291883; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A reduced toxicity fuel satellite propulsion system including a reduced toxicity propellant supply for consumption in an axial class thruster and an ACS class thruster. The system includes suitable valves and conduits for supplying the reduced toxicity propellant to the ACS decomposing element of an ACS thruster. The ACS decomposing element is operative to decompose the reduced toxicity propellant into hot propulsive gases. In addition the system includes suitable valves and conduits for supplying the reduced toxicity propellant to an axial decomposing element of the axial thruster. The axial decomposing element is operative to decompose the reduced toxicity propellant into hot gases. The system further includes suitable valves and conduits for supplying a second propellant to a combustion chamber of the axial thruster, whereby the hot gases and the second propellant auto-ignite and begin the combustion process for producing thrust.

Official Gazette of the U.S. Patent and Trademark Office

*Combustion Chambers; Decomposition; Ignition; Propellant Combustion; Propellant Consumption; Reaction Kinetics; Toxicity*



32

## COMMUNICATIONS AND RADAR

*Includes radar; land and global communications; communications theory; and optical communications. For related information see also 04 Aircraft Communications and Navigation and 17 Space Communications, Spacecraft Communications, Command and Tracking. For search and rescue see 03 Air Transportation and Safety, and 16 Space Transportation.*

**20010094776** NASA Langley Research Center, Hampton, VA USA

### **Piezoelectric Vibrational and Acoustic Alert for a Personal Communication Device**

Woodard, Stanley E., Inventor, NASA Langley Research Center, USA; Hellbaum, Richard F., Inventor, NASA Langley Research Center, USA; Daugherty, Robert H., Inventor, NASA Langley Research Center, USA; Scholz, Raymond C., Inventor, NASA Langley Research Center, USA; Little, Bruce D., Inventor, NASA Langley Research Center, USA; Fox, Robert L., Inventor, NASA Langley Research Center, USA; Denhardt, Gerald A., Inventor, NASA Langley Research Center, USA; Jang, SeGon, Inventor, NASA Langley Research Center, USA; Balein, Rizza, Inventor, NASA Langley Research Center, USA; Jul. 10, 2001; 13p; In English; Continuation-in-part of US-Patent-Appl-SN-344030, filed 25 Jun. 1999 and provisional of US-Patent-Appl-SN-098658, filed 31 Aug. 1998

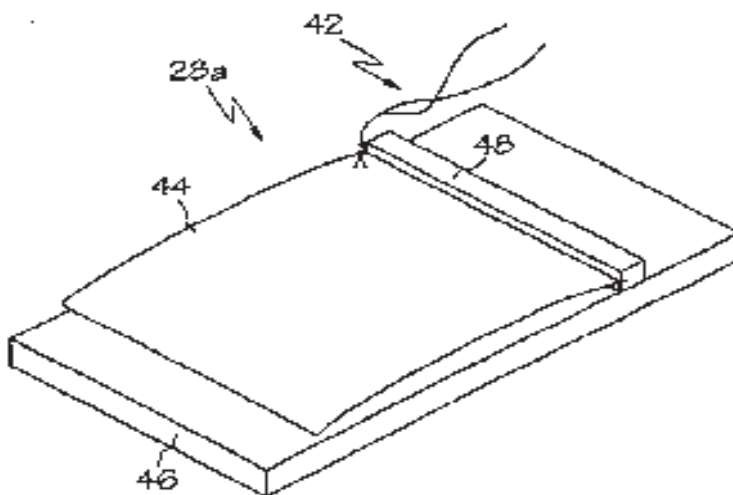
Patent Info.: Filed 31 Aug. 1999; NASA-Case-LAR-15764-1; US-Patent-6,259,188; US-Patent-Appl-SN-386682; US-Patent-

Appl-SN-344030; US-Patent-Appl-SN-098658; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An alert apparatus for a personal communication device includes a mechanically prestressed piezoelectric wafer positioned within the personal communication device and an alternating voltage input line coupled at two points of the wafer where polarity is recognized. The alert apparatus also includes a variable frequency device coupled to the alternating voltage input line, operative to switch the alternating voltage on the alternating voltage input line at least between an alternating voltage having a first frequency and an alternating voltage having a second frequency. The first frequency is preferably sufficiently high so as to cause the wafer to vibrate at a resulting frequency that produces a sound perceptible by a human ear, and the second frequency is preferably sufficiently low so as to cause the wafer to vibrate at a resulting frequency that produces a vibration readily felt by a holder of the personal communication device.

Author

*Communication Equipment; Frequencies; Piezoelectricity; Signal Transmission; Wafers*



**20010095540** NASA Pasadena Office, CA USA

**Satellite-Tracking Millimeter-Wave Reflector Antenna System For Mobile Satellite-Tracking**

Densmore, Arthur C., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Jamnejad, Vahraz, Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Woo, Kenneth E., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Jun. 12, 2001; 24p; In English; Reissue of US-Patent-Appl-SN-999796, filed 30 Nov. 1992

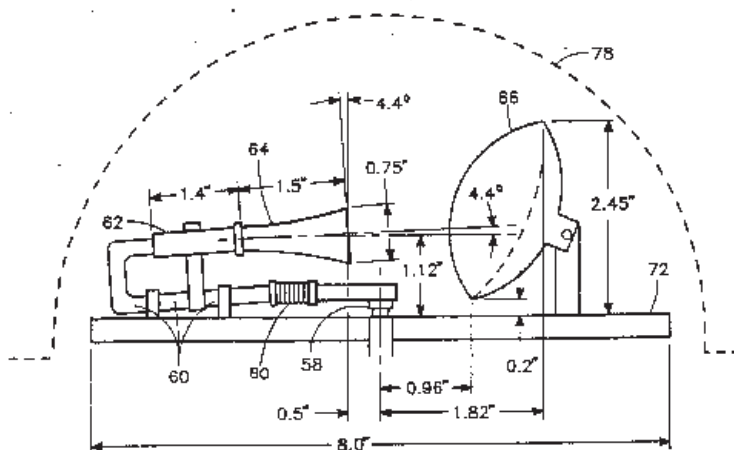
Patent Info.: Filed 15 Feb. 1996; NASA-Case-NPO-18772-R; US-Patent-R,E37,218; US-Patent-Appl-SN-613739; US-Patent-Appl-SN-999794; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A miniature dual-band two-way mobile satellite-tracking antenna system mounted on a movable vehicle includes a miniature parabolic reflector dish having an elliptical aperture with major and minor elliptical axes aligned horizontally and vertically, respectively, to maximize azimuthal directionality and minimize elevational directionality to an extent corresponding to expected pitch excursions of the movable ground vehicle. A feed-horn has a back end and an open front end facing the reflector dish and has vertical side walls opening out from the back end to the front end at a lesser horn angle and horizontal top and bottom walls opening out from the back end to the front end at a greater horn angle. An RF circuit couples two different signal bands between the feed-horn and the user. An antenna attitude controller maintains an antenna azimuth direction relative to the satellite by rotating it in azimuth in response to sensed yaw motions of the movable ground vehicle so as to compensate for the yaw motions to within a pointing error angle. The controller sinusoidally dithers the antenna through a small azimuth dither angle greater than the

pointing error angle while sensing a signal from the satellite received at the reflector dish, and deduces the pointing angle error from dither-induced fluctuations in the received signal.

Official Gazette of the U.S. Patent and Trademark Office

*Antenna Design; Millimeter Waves; Reflector Antennas; Satellite Tracking; Portable Equipment; Miniature Electronic Equipment*



**20010098307** NASA Glenn Research Center, Cleveland, OH USA

# **Multi-Mode Broadband Patch Antenna**

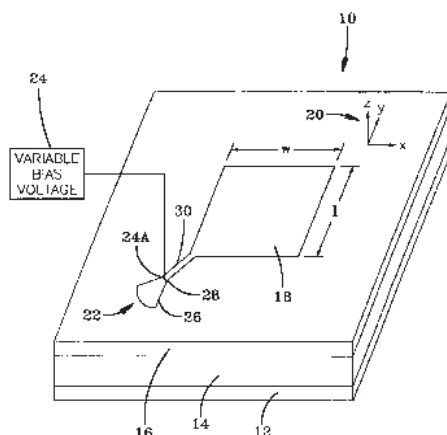
Romanofsky, Robert R., Inventor, NASA Glenn Research Center, USA; Sep. 18, 2001; 18p; In English

Patent Info.: Filed 4 May 2000; NASA-Case-LEW-16792-1; US-Patent-6,292,143; US-Patent-Appl-SN-566839; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A multi-mode broad band patch antenna is provided that allows for the same aperture to be used at independent frequencies such as reception at 19 GHz and transmission at 29 GHz. Furthermore, the multi-mode broadband patch antenna provides a ferroelectric film that allows for tuning capability of the multi-mode broadband patch antenna over a relatively large tuning range. The alternative use of a semiconductor substrate permits reduced control voltages since the semiconductor functions as a counter electrode.

Author

*Broadband; Patch Antennas; Ferroelectricity; Tuning; Semiconductors (Materials); Microwave Transmission*



**20010111098** NASA Johnson Space Center, Houston, TX USA

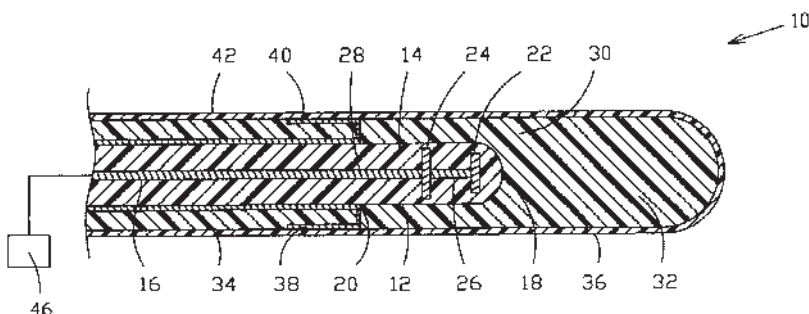
**Transcatheter Microwave Antenna**

Arndt, Dickey G., Inventor, NASA Johnson Space Center, USA; Carl, James R., Inventor, NASA Johnson Space Center, USA; Ngo, Phong, Inventor, NASA Johnson Space Center, USA; Raffoul, George W., Inventor, NASA Johnson Space Center, USA; Sep. 11, 2001; 14p; In English; Continuation-in-part of US-Patent-Appl-SN-154989, filed 17 Sep. 1998; US-Patent- Appl-SN-162457, filed 16 Sep. 1998; US-Patent-Appl-SN-154622, filed 16 Sep. 1998; US-Patent-Appl-SN-641045, filed 17 Apr. 1996 Patent Info.: Filed 23 Feb. 2000; NASA-Case-MSC-23049-1; US-Patent-6,289,249; US-Patent-Appl-SN-511961; US-Patent-Appl-SN-154989; US-Patent-Appl-SN-162457; US-Patent-Appl-SN-154622; US-Patent-Appl-SN-641045; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method, simulation, and apparatus are provided that are highly suitable for treatment of benign prostatic hyperplasia (BPH). A catheter is disclosed that includes a small diameter disk loaded monopole antenna surrounded by fusion material having a high heat of fusion and a melting point preferably at or near body temperature. Microwaves from the antenna heat prostatic tissue to promote necrosing of the prostatic tissue that relieves the pressure of the prostatic tissue against the urethra as the body reabsorbs the necrosed or dead tissue. The fusion material keeps the urethra cool by means of the heat of fusion of the fusion material. This prevents damage to the urethra while the prostatic tissue is necrosed. A computer simulation is provided that can be used to predict the resulting temperature profile produced in the prostatic tissue. by changing the various control features of the catheter and method of applying microwave energy a temperature profile can be predicted and produced that is similar to the temperature profile desired for the particular patient.

Official Gazette of the U.S. Patent and Trademark Office

*Catheterization; Microwave Antennas; Prostate Gland; Medical Equipment; Tissues (Biology)*



**33**

**ELECTRONICS AND ELECTRICAL ENGINEERING**

*Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also 60 Computer Operations and Hardware and 76 Solid-State Physics.*

**20010094780** NASA Glenn Research Center, Cleveland, OH USA

**Method of Making a Nickel Fiber Electrode for a Nickel Based Battery System**

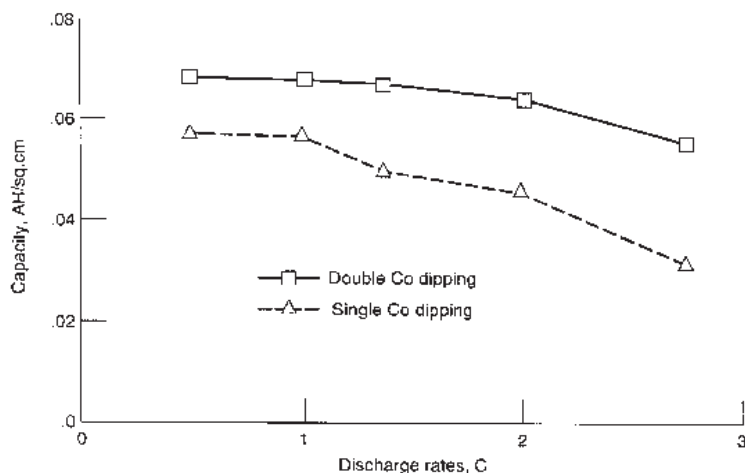
Britton, Doris L., Inventor, NASA Glenn Research Center, USA; Jul. 24, 2001; 8p; In English Patent Info.: Filed 27 Oct. 1994; NASA-Case-LEW-15817-1; US-Patent-6,265,112; US-Patent-Appl-SN-331067; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The general purpose of the invention is to develop a high specific energy nickel electrode for a nickel based battery system. The invention discloses a method of producing a lightweight nickel electrode which can be cycled to deep depths of discharge

(i.e., 40% or greater of electrode capacity). These deep depths of discharge can be accomplished by depositing the required amount of nickel hydroxide active material into a lightweight nickel fiber substrate.

Author

*Electric Discharges; Electrodes; Inventions; Fabrication; Nickel Hydrogen Batteries*



**20010096172** NASA Glenn Research Center, Cleveland, OH USA

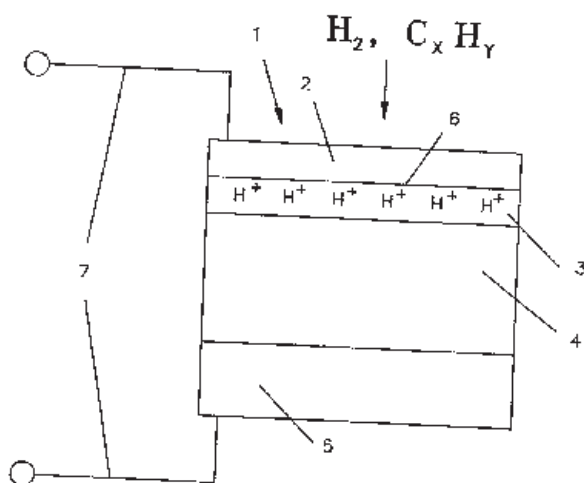
### Gas Sensing Diode Comprising SiC

Hunter, Gary William, Inventor, NASA Glenn Research Center, USA; Sep. 18, 2001; 6p; In English; Division of US-Patent-Appl-SN-093840, filed 29 May 1998

Patent Info.: NASA-Case-LEW-16519-2; US-Patent-6,291,838; US-Patent-Appl-SN-448406; US-Patent-Appl-SN-093840; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A diode for sensing hydrogen and hydrocarbons and the process for manufacturing the diode are disclosed. The diode is a Schottky diode which has a palladium chrome contact on the C-face of an n-type 6H Silicon carbide epilayer. The epilayer is grown on the C-face of a 6H silicon carbide substrate. The diode is capable of measuring low concentrations of hydrogen and hydrocarbons at high temperatures, for example, 800 degrees C. The diode is both sensitive and stable at elevated temperatures. Official Gazette of the U.S. Patent and Trademark Office

*Detection; Gas Analysis; Hydrocarbons; Hydrogen; Manufacturing; Schottky Diodes; Silicon Carbides*



20010097878 NASA Pasadena Office, CA USA

### Battery Cell By-Pass Circuit

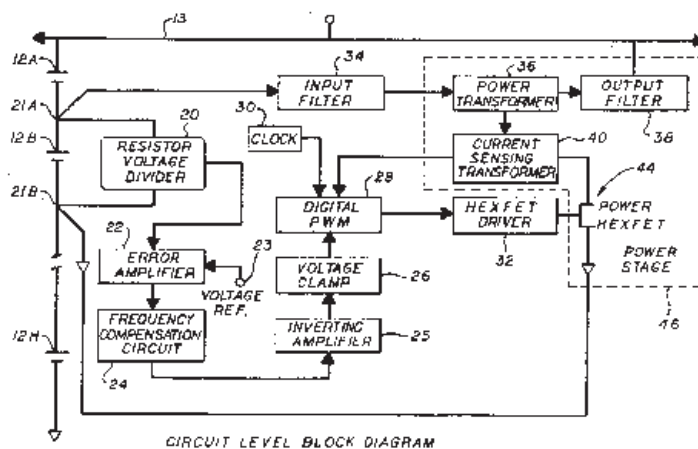
Evers, Jeffrey, Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Gelger, Ronald V., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Aug. 07, 2001; 6p; In English

Patent Info.: Filed 5 Jul. 2000; NASA-Case-NPO-30270-1; US-Patent-6,271,646; US-Patent-Appl-SN-610351; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The invention is a circuit and method of limiting the charging current voltage from a power supply net work applied to an individual cell of a plurality of cells making up a battery being charged in series. It is particularly designed for use with batteries that can be damaged by overcharging, such as Lithium-ion type batteries. In detail, the method includes the following steps: 1) sensing the actual voltage level of the individual cell; 2) comparing the actual voltage level of the individual cell with a reference value and providing an error signal representative thereof; and 3) by-passing the charging current around individual cell necessary to keep the individual cell voltage level generally equal a specific voltage level while continuing to charge the remaining cells. Preferably this is accomplished by by-passing the charging current around the individual cell if said actual voltage level is above the specific voltage level and allowing the charging current to the individual cell if the actual voltage level is equal or less than the specific voltage level. In the step of bypassing the charging current, the by-passed current is transferred at a proper voltage level to the power supply. The by-pass circuit a voltage comparison circuit is used to compare the actual voltage level of the individual cell with a reference value and to provide an error signal representative thereof. A third circuit, designed to be responsive to the error signal, is provided for maintaining the individual cell voltage level generally equal to the specific voltage level. Circuitry is provided in the third circuit for bypassing charging current around the individual cell if the actual voltage level is above the specific voltage level and transfers the excess charging current to the power supply net work. The circuitry also allows charging of the individual cell if the actual voltage level is equal or less than the specific voltage level.

Official Gazette of the U.S. Patent and Trademark Office

*Circuits; Electric Potential; Electric Batteries; Electric Charge; Bypasses*



20010097898 NASA Glenn Research Center, Cleveland, OH USA

### Processes For Cleaning a Cathode Tube and Assemblies In A Hollow Cathode Assembly

Patterson, Michael J., Inventor, NASA Glenn Research Center, USA; Verhey, Timothy R. R., Inventor, NASA Glenn Research Center, USA; Soulas, George C., Inventor, NASA Glenn Research Center, USA; Jun. 05, 2001; 20p; In English; Division of US-Patent-Appl-SN-152407, filed 14 Sep. 1998

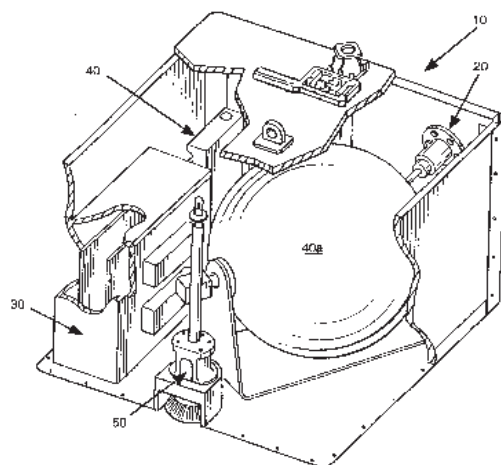
Patent Info.: Filed 14 Feb. 2000; NASA-Case-LEW-16056-2; US-Patent-6,240,932; US-Patent-Appl-SN-503658; US-Patent-Appl-SN-152407; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The present invention is a process for cleaning a cathode tube and other subassemblies in a hollow cathode assembly. In the disclosed process, hand covering elastomer gloves are used for handling all cathode assembly parts. The cathode tube and other subassemblies are cleaned with a lint-free cloth damped with acetone, then wiped with alcohol, immersed in ethyl alcohol or

acetone, and ultrasonic agitation is applied, heating to 60 C. for ethyl alcohol or 56 C. for acetone. The cathode tube and other subassemblies are dried by blowing with nitrogen gas.

Official Gazette of the U.S. Patent and Trademark Office

*Hollow Cathodes; Tube Cathodes; Elastomers; Gloves; Subassemblies; Ultrasonic Agitation; Chemical Sterilization*



**20010110720** NASA Pasadena Office, CA USA

**Protective Fullerene (C60) Packaging System for Microelectromechanical Systems Applications**

Olivas, John D., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Aug. 21, 2001; 6p; In English

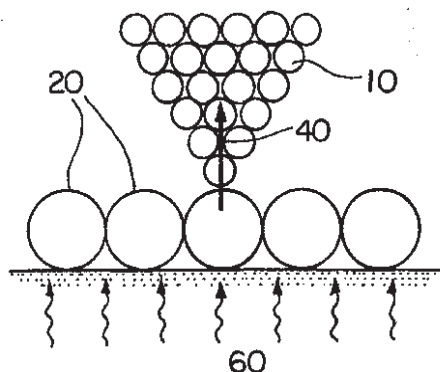
Patent Info.: Filed 3 May 1999; NASA-Case-NPO-20148-2; US-Patent-6,277,438; US-Patent-Appl-SN-310774; No Copyright;

Avail: CASI; A02, Hardcopy; A01, Microfiche

The invention involves a method for locating the probe of a scanning tunneling micrograph a predetermined distance from its conducting surface, and specifically the deposition of a monolayer of fullerene C60 onto the conducting plate. The Fullerene C60 molecule is approximately spherical and a monolayer of fullerene has a thickness of one nanometer. by providing a monolayer of fullerene on the conducting surface and locating the probe on the surface of the monolayer, a distance of one nanometer can be established between the probe tip and the conducting surface.

Official Gazette of the U.S. Patent and Trademark Office

*Fullerenes; Microelectromechanical Systems; Packaging; Metal Surfaces*



20010110766 NASA Goddard Space Flight Center, Greenbelt, MD USA

**Method and Apparatus for High Data Rate Demodulation**

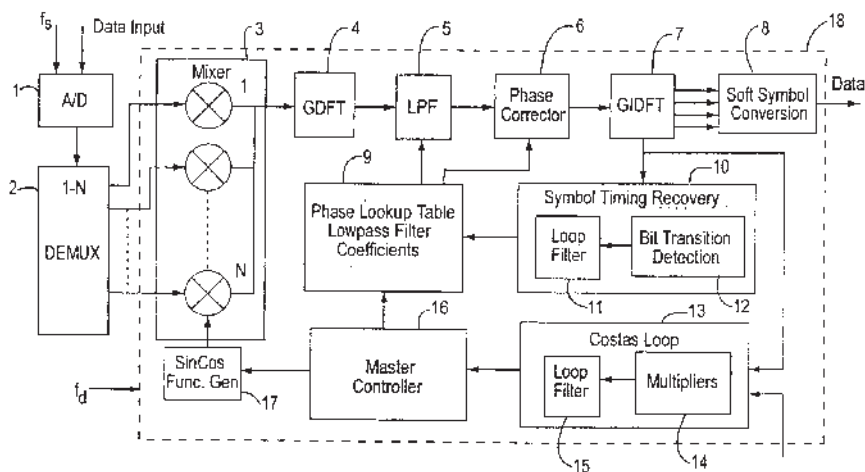
Grebowsky, Gerald J., Inventor, NASA Goddard Space Flight Center, USA; Gray, Andrew A., Inventor, NASA Goddard Space Flight Center, USA; Srinivasan, Meera, Inventor, NASA Goddard Space Flight Center, USA; Jan. 23, 2001; 38p; In English; Provisional application of US-Patent-Appl-SN-094953, filed 31 Jul. 1998

Patent Info.: Filed 30 Jul. 1999; NASA-Case-GSC-13963-1; US-Patent-6,177,835; US-Patent-Appl-SN-363883; US-Patent-Appl-SN-094963; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method to demodulate BPSK or QPSK data using clock rates for the receiver demodulator of one-fourth the data rate is presented. This is accomplished through multirate digital signal processing techniques. The data is sampled with an analog-to-digital converter and then converted from a serial data stream to a parallel data stream. This signal processing requires a clock cycle four times the data rate. Once converted into a parallel data stream, the demodulation operations including complex baseband mixing, lowpass filtering, detection filtering, symbol-timing recovery, and carrier recovery are all accomplished at a rate one-fourth the data rate. The clock cycle required is one-sixteenth that required by a traditional serial receiver based on straight convolution. The high rate data demodulator will demodulate BPSK, QPSK, UQPSK, and DQPSK with data rates ranging from 10 Mega-symbols to more than 300 Mega-symbols per second. This method requires less clock cycles per symbol than traditional serial convolution techniques.

Official Gazette of the U.S. Patent and Trademark Office

*Demodulation; Methodology; Data Flow Analysis*



20010110768 NASA Goddard Space Flight Center, Greenbelt, MD USA

**Chip for CCSDS Compatible Serial Data Streams**

Dowling, Jason T., Inventor, NASA Goddard Space Flight Center, USA; Jan. 23, 2001; 18p; In English; Provisional application of US-Patent-Appl-SN-029333, filed 30 Oct. 1996

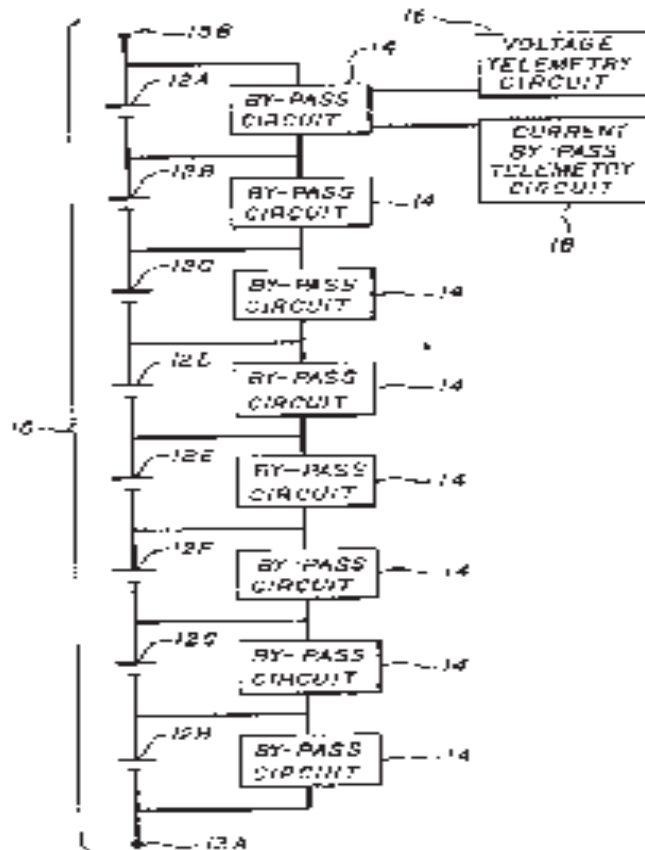
Patent Info.: Filed 29 Oct. 1997; NASA-Case-GSC-13890-1; US-Patent-6,178,470; US-Patent-Appl-SN-960355; US-Patent-Appl-SN-029333; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche



is above the specific voltage level and transfers the excess charging current to the power supply net work. The circuitry also allows charging of the individual cell if the actual voltage level is equal or less than the specific voltage level.

Official Gazette of the U.S. Patent and Trademark Office

*Circuits; Electric Potential; Electric Batteries; Electric Charge; Bypasses*



20010111099 NASA Johnson Space Center, Houston, TX USA

### Microstrip Patch Antenna and Method

Fink, Patrick W., Inventor, NASA Johnson Space Center, USA; Sep. 11, 2001; 12p; In English

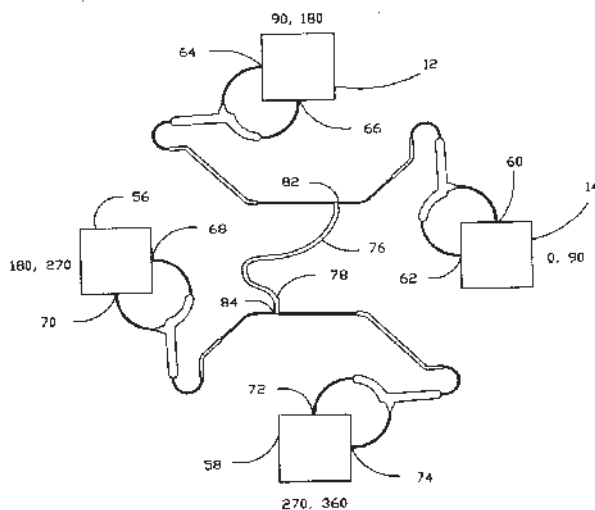
Patent Info.: Filed 23 Nov. 1999; NASA-Case-MS-C-23089-1; US-Patent--6,288,677; US-Patent-Appl-SN-451814; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Method and apparatus are provided for a microstrip feeder structure for supplying properly phased signals to each radiator element in a microstrip antenna array that may be utilized for radiating circularly polarized electromagnetic waves. In one disclosed embodiment, the microstrip feeder structure includes a plurality of microstrip sections many or all of which preferably have an electrical length substantially equal to one-quarter wavelength at the antenna operating frequency. The feeder structure

provides a low loss feed structure that may be duplicated multiple times through a set of rotations and translations to provide a radiating array of the desired size.

Official Gazette of the U.S. Patent and Trademark Office

*Patch Antennas; Microstrip Antennas; Feeders; Antenna Arrays; Electromagnetic Radiation*



**20010125601** NASA Marshall Space Flight Center, Huntsville, AL USA

### **Power Divider for Harmonically Rich Waveforms**

Sims, William Herbert, III, Inventor, NASA Marshall Space Flight Center, USA; Nov. 20, 2001; 12p; In English

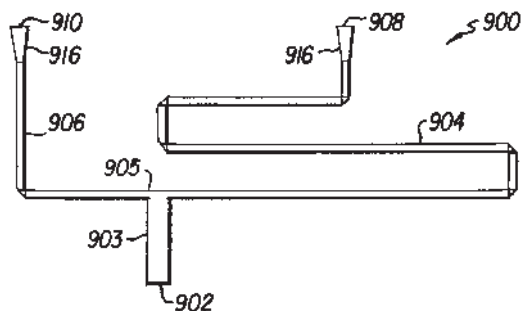
Patent Info.: Filed 29 Oct. 1998; NASA-Case-MFS-31186-1; US-Patent-6,320,478; US-Patent-Appl-SN-182553; No Copyright;

Avail: CASI; A03, Hardcopy; A01, Microfiche

A power divider divides an RF signal into two output signals having a phase difference of 180 deg. or a multiple thereof. When the RF signal is a square wave or another harmonically rich signal, the phases of the fundamental and the harmonics have the proper relationship. The divider can be implemented in the form of microstrips on a board, with one of the output microstrips having several bends to provide a different electrical length from the other.

Official Gazette of the U.S. Patent and Trademark Office

*Radio Frequencies; Dividers*

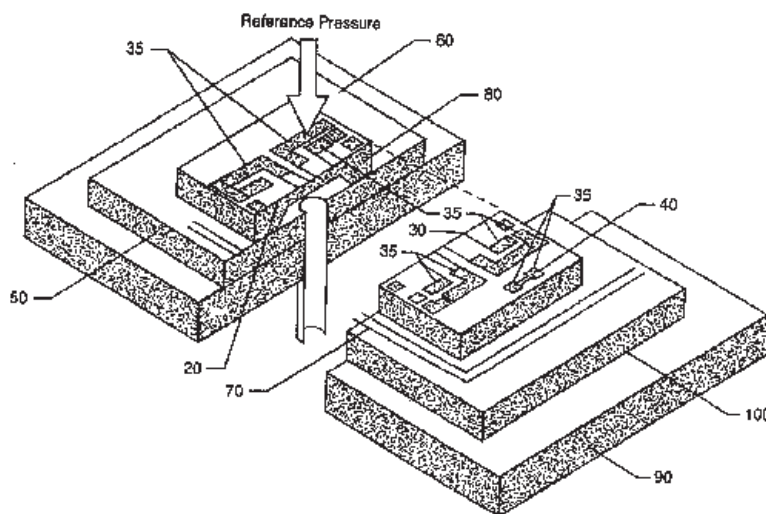


**20010096161** NASA Langley Research Center, Hampton, VA USA

Chapman, John J., Inventor, NASA Langley Research Center, USA; Hopson, Purnell, Jr., Inventor, NASA Langley Research Center, USA; Holloway, Nancy M., Inventor, NASA Langley Research Center, USA; Jun. 19, 2001; 28p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-944026, filed 25 Aug. 1997 which is a continuation-in-part of abandoned US-Patent-Appl-SN-416596, filed 4 Apr. 1995

A miniature, multi-channel, electronically scanned pressure measuring device uses electrostatically bonded silicon dies in a multi-element array. These dies are bonded at specific sites on a glass, pre-patterned substrate. Thermal data is multiplexed and recorded on each individual pressure measuring diaphragm. The device functions in a cryogenic environment without the need of heaters to keep the sensor at constant temperatures.

### Miniaturization; Pressure Measurement; Pressure Sensors



### Alumina Encapsulated Strain Gage Not Mechanically Attached to The Substrate, Used to Temperature Compensate an Active High Temperature Gage In A Half-Bridge Configuration

Patent Info.: Filed 17 Dec. 1998; NASA-Case-DRC-09607-4; US-Patent-6,301,775; US-Patent-Appl-SN-252622; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

25



20010125616 NASA Marshall Space Flight Center, Huntsville, AL USA

**System and Method for Determining Rate of Rotation Using Brushless DC Motor**

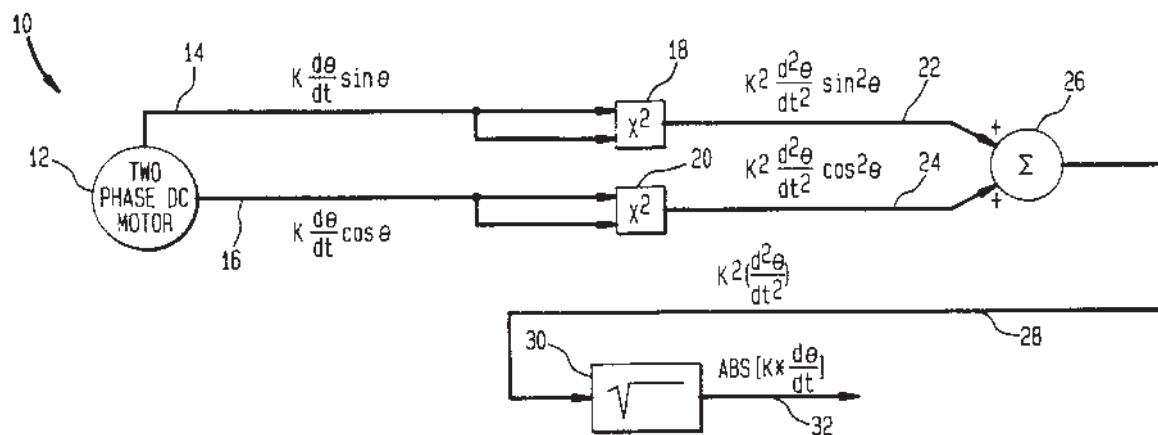
Howard, David E., Inventor, NASA Marshall Space Flight Center, USA; Smith, Dennis A., Inventor, NASA Marshall Space Flight Center, USA; Nov. 07, 2000; 6p; In English

Patent Info.: Filed 27 Jul. 1998; NASA-Case-MFS-31143-1; US-Patent-6,144,198; US-Patent-Appl-SN-128634; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A system and method are provided for measuring rate of rotation. A brushless DC motor is rotated and produces a back electromagnetic force (emf) on each winding thereof. Each winding's back-emf is squared. The squared outputs associated with each winding are combined, with the square root being taken of such combination, to produce a DC output proportional only to the rate of rotation of the motor's shaft.

Official Gazette of the U.S. Patent and Trademark Office

*Shafts (Machine Elements); Speed Indicators*



20010125617 NASA Langley Research Center, Hampton, VA USA

**Cryogenic, Absolute, High Pressure Sensor**

Chapman, John J., Inventor, NASA Langley Research Center, USA; Shams. Qamar A., Inventor, NASA Langley Research Center, USA; Powers, William T., Inventor, NASA Langley Research Center, USA; Jun. 05, 2001; 8p; In English; Continuation of abandoned US-Patent-Appl-SN-681245, filed 22 Jul. 1996

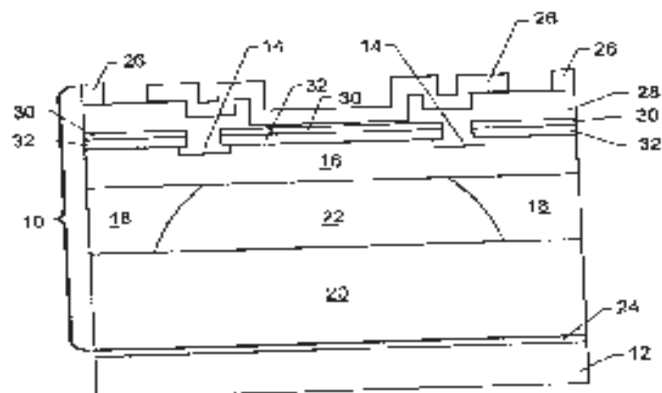
Patent Info.: Filed 10 Dec. 1996; NASA-Case-LAR-15280-2-SB; US-Patent-6,240,785; US-Patent-Appl-SN-778065; US-Patent-Appl-SN-681245; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A pressure sensor is provided for cryogenic, high pressure applications. A highly doped silicon piezoresistive pressure sensor is bonded to a silicon substrate in an absolute pressure sensing configuration. The absolute pressure sensor is bonded to an aluminum nitride substrate. Aluminum nitride has appropriate coefficient of thermal expansion for use with highly doped silicon

at cryogenic temperatures. A group of sensors, either two sensors on two substrates or four sensors on a single substrate are packaged in a pressure vessel.

Official Gazette of the U.S. Patent and Trademark Office

*Cryogenic Temperature; Detection; High Pressure; Pressure Sensors*



**20010125619** NASA Langley Research Center, Hampton, VA USA

**Thickness Measurement Device for Ice, or Ice Mixed with Water or Other Liquid**

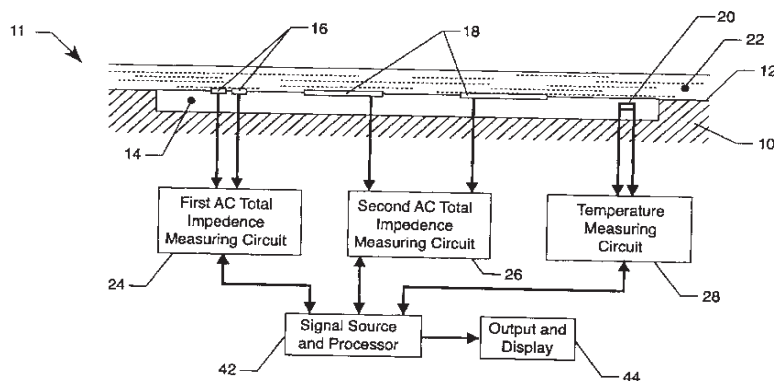
Weinstein, Leonard M., Inventor, NASA Langley Research Center, USA; May 29, 2001; 11p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-060590, filed 15 Apr. 1998, which is a continuation-in-part of US-Patent-Appl-SN-619779, filed 20 Mar. 1996

Patent Info.: Filed 4 Apr. 2000; NASA-Case-LAR-16093-1; US-Patent-6,239,601; US-Patent-Appl-SN-545860; US-Patent-Appl-SN-060590; US-Patent-Appl-SN-619779; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A Device and Method are provide for determining the thickness of a layer of solid ice, a mixture of ice and water, or a mixture of ice arid other liquid, accumulated on the outer surface of an object. First and second total impedance sensors are operated at first and second frequencies. Corresponding first and second AC total impedance measuring circuits are coupled to The first and second sensors to produce output voltages based on the total impedance changes sensed by the sensors. A processor is coupled to the first and second measuring circuits to generate an output value using the measured output voltages. The output value s indicative of the thickness of the ice or ice and water mixture, or ice and other liquid.

Official Gazette of the U.S. Patent and Trademark Office

*Alternating Current; Ice; Thickness; Depth Measurement*



## 36 LASERS AND MASERS

*Includes parametric amplifiers. For related information see also 76 Solid-State Physics.*

**20010125635** NASA Langley Research Center, Hampton, VA USA

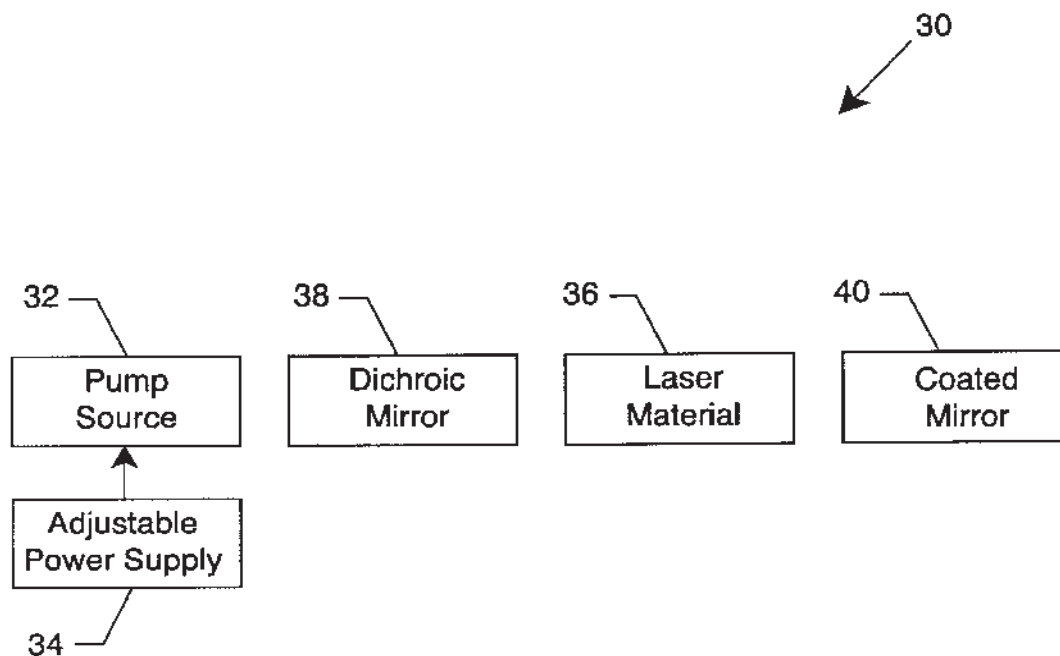
### **Method of Controlling Lasing Wavelength(s)**

Barnes, Norman P., Inventor, NASA Langley Research Center, USA; Murray, Keith E., Inventor, NASA Langley Research Center, USA; Hutcheson, Ralph L., Inventor, NASA Langley Research Center, USA; Oct. 31, 2000; 9p; In English  
Patent Info.: Filed 13 May 1998; NASA-Case-LAR-15564-1-SB; US-Patent-6,141,368; US-Patent-Appl-SN-078410; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A method is provided to control the lasing wavelength of a laser material without changing or adjusting the mechanical components of a laser device. The rate at which the laser material is pumped with the pumping energy is controlled so that lasing occurs at one or more lasing wavelengths based on the rate. The lasing wavelengths are determined by transition lifetimes and/or energy transfer rates.

Official Gazette of the U.S. Patent and Trademark Office

*Lasing; Laser Materials; Wavelengths*



## 37 MECHANICAL ENGINEERING

*Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.*

**20010094775** NASA Johnson Space Center, Houston, TX USA

### **Method for Providing a Jewel Bearing for Supporting a Pump Rotor Shaft**

Aber, Gregory S., Inventor, NASA Johnson Space Center, USA; Jul. 03, 2001; 22p; In English; Division of US-Patent-Appl-SN-644579, filed 10 May 1996

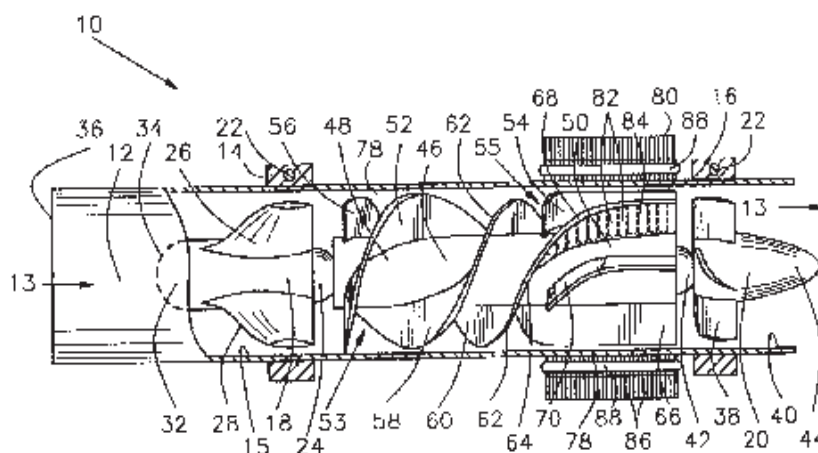
Patent Info.: Filed 9 Jul. 1999; NASA-Case-MS-C-22721-2; US-Patent-6,254,359; US-Patent-Appl-SN-354915; US-Patent-Appl-SN-644579; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Methods for a blood pump bearing system within a pump housing to support long-term high-speed rotation of a rotor with an impeller blade having a plurality of individual magnets disposed thereon to provide a small radial air gap between the magnets

and a stator of less than 0.025 inches. The bearing system may be mounted within a flow straightener, diffuser, or other pump element to support the shaft of a pump rotor. The bearing system includes a zirconia shaft having a radiused end. The radiused end has a first radius selected to be about three times greater than the radius of the zirconia shaft. The radiused end of the zirconia shaft engages a flat sapphire endstone. Due to the relative hardness of these materials a flat is quickly produced during break-in on the zirconia radiused end of precisely the size necessary to support thrust loads whereupon wear substantially ceases. Due to the selection of the first radius, the change in shaft end-play during pump break-in is limited to a total desired end-play of less than about 0.010 inches. Radial loads are supported by an olive hole ring jewel that makes near line contact around the circumference of the shaft to support high speed rotation with little friction. The width of olive hole ring jewel is small to allow heat to conduct through to thereby prevent heat build-up in the bearing. A void defined by the bearing elements may fill with blood that then coagulates within the void. The coagulated blood is then conformed to the shape of the bearing surfaces.

Author

*Blood Pumps; Rotor Blades (Turbomachinery); Rotors; Sapphire; Shafts (Machine Elements); Zirconium Oxides; Bearings*



**20010095543** NASA Johnson Space Center, Houston, TX USA

### **Solar-Powered Refrigeration System**

Ewert, Michael K., Inventor, NASA Johnson Space Center, USA; Bergeron, David J., III, Inventor, NASA Johnson Space Center, USA; Jul. 03, 2001; 6p; In English

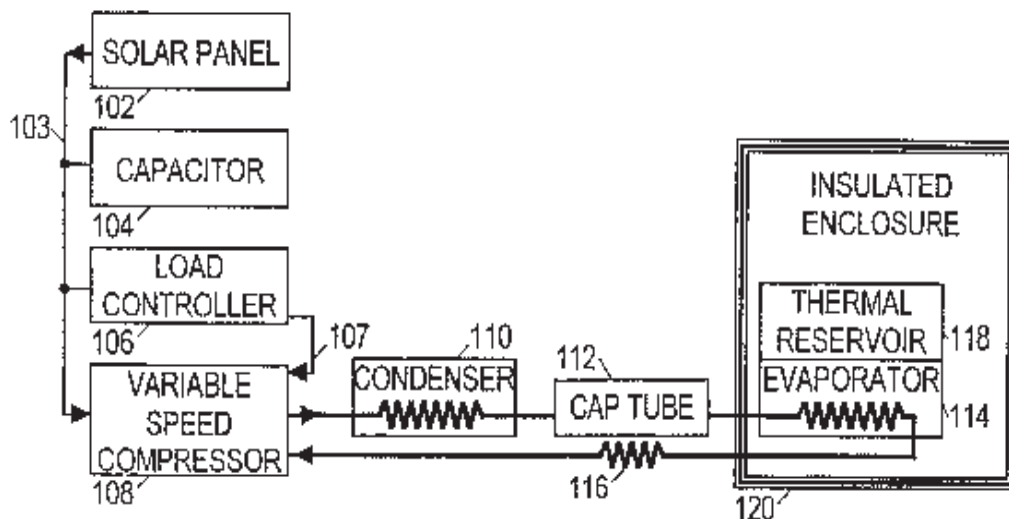
Patent Info.: Filed 3 Jun. 1999; MSC-22970-1; US-Patent-6,253,563; US-Patent-Appl-SN-337208; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A solar powered vapor compression refrigeration system is made practicable with thermal storage and novel control techniques. In one embodiment, the refrigeration system includes a photovoltaic panel, a variable speed compressor, an insulated enclosure, and a thermal reservoir. The photovoltaic (PV) panel converts sunlight into DC (direct current) electrical power. The DC electrical power drives a compressor that circulates refrigerant through a vapor compression refrigeration loop to extract heat from the insulated enclosure. The thermal reservoir is situated inside the insulated enclosure and includes a phase change material. As heat is extracted from the insulated enclosure, the phase change material is frozen, and thereafter is able to act as a heat sink to maintain the temperature of the insulated enclosure in the absence of sunlight. The conversion of solar power into stored thermal energy is optimized by a compressor control method that effectively maximizes the compressor's usage of available energy. A capacitor is provided to smooth the power voltage and to provide additional current during compressor start-up. A controller monitors the rate of change of the smoothed power voltage to determine if the compressor is operating below or above the available

power maximum, and adjusts the compressor speed accordingly. In this manner, the compressor operation is adjusted to convert substantially all available solar power into stored thermal energy.

Official Gazette of the U.S. Patent and Trademark Office

*Sunlight; Photovoltaic Cells; Photovoltaic Conversion; Refrigerators*



**20010111032** NASA Pasadena Office, CA USA

### **Sealing Assembly for Sealing a Port and the Like**

Haas, Jon W., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Haupt, Charles W., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Oct. 10, 2000; 6p; In English

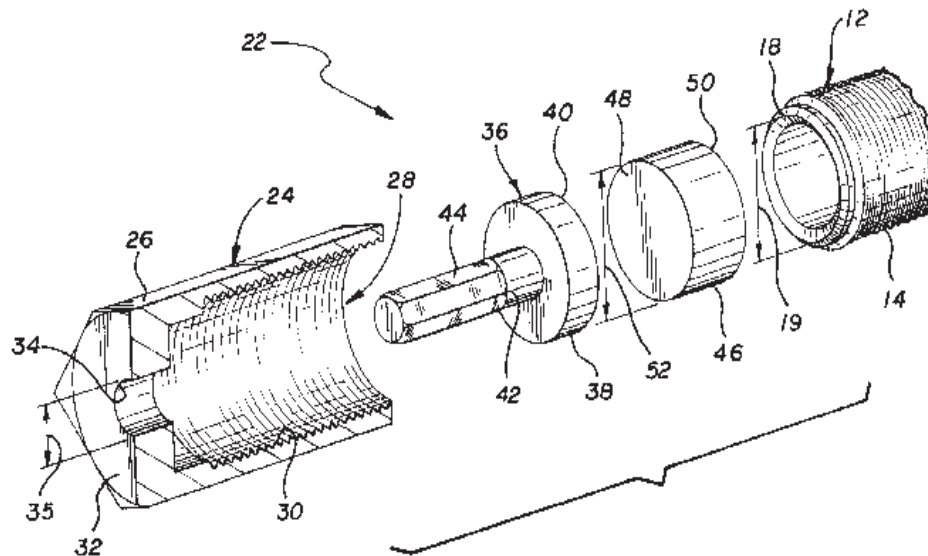
Patent Info.: Filed 27 Apr. 1999; NASA-Case-NPO-30307-1T; US-Patent-6,129,359; US-Patent-Appl-SN-300561; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The sealing assembly for a port of a valve or the like is disclosed. In detail, the sealing assembly includes the port having a circular shaped end with a circular shaped knife-edge thereon. The sealing assembly further includes a hollow cap having a closed first end with an aperture therethrough and an open second end. The cap further includes internal threads adapted to mate with the external threads of the port. A gasket is mounted within the cap having flat first and second principle sides and made of a deformable metal, the first principle side of the gasket for mounting against the circular shaped knife edge of the port. A plunger having a circular shaped disc portion is adapted to fit within the hollow cap and is engagable with the first principle surface of the gasket and includes a shaft portion extending out of the aperture. The cap and shaft of the plunger include external wrenching flats. Thus when the cap is screwed onto the port and the plunger is prevented from rotating by a wrench mounted on the wrenching

flats of the shaft portion of the plunger, the gasket is forced into engagement with the knife edge in pure compression and no rotation of the gasket occurs causing the knife edge to locally deform the gasket sealing of the port.

Official Gazette of the U.S. Patent and Trademark Office

*Sealing; Ports (Openings)*



**20010111096** NASA Glenn Research Center, Cleveland, OH USA

### **Assembly For Moving a Robotic Device Along Selected Axes**

Nowlin, Brentley Craig, Inventor, NASA Glenn Research Center, USA; Koch, Lisa Danielle, Inventor, NASA Glenn Research Center, USA; Oct. 23, 2001; 16p; In English

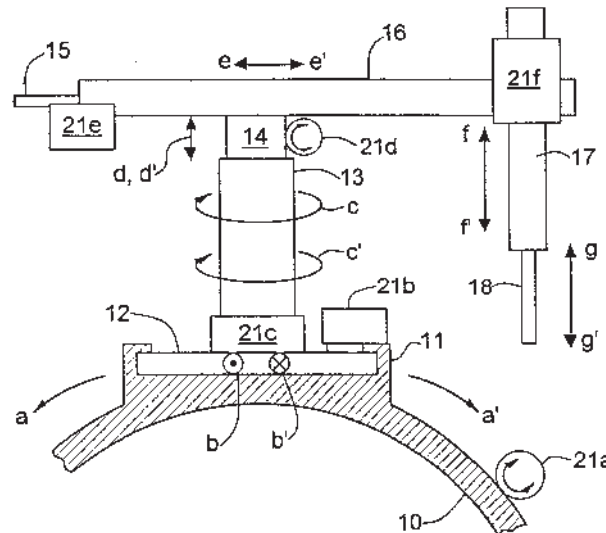
Patent Info.: Filed 9 Jun. 2000; NASA-Case-LEW-16690-1; US-Patent-6,308,113; US-patent-Appl-SN-606103; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An assembly for moving a robotic device along selected axes includes a programmable logic controller (PLC) for controlling movement of the device along selected axes to effect movement of the device to a selected disposition. The PLC includes a plurality of single axis motion control modules, and a central processing unit (CPU) in communication with the motion control modules. A human-machine interface is provided for operator selection of configurations of device movements and is in

communication with the CPU. A motor drive is in communication with each of the motion control modules and is operable to effect movement of the device along the selected axes to obtain movement of the device to the selected disposition.

Official Gazette of the U.S. Patent and Trademark Office

*Robotics; Robot Control; Controllers; Command and Control; Man Machine Systems*



**20010125606** NASA Marshall Space Flight Center, Huntsville, AL USA

**Apparatus and Method for Generating Thrust Using a Two Dimensional, Asymmetrical Capacitor Module**

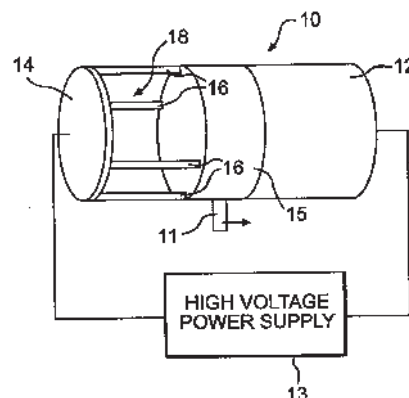
Campbell, Jonathan W., Inventor, NASA Marshall Space Flight Center, USA; Nov. 13, 2001; 7p; In English

Patent Info.: Filed 8 Mar. 2000; NASA-Case-MFS-31419-1; US-Patent-6,317,310; US-Patent-Appl-SN-520817; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A capacitor module system is provided for creating a thrust force. The system includes a capacitor module provided with a first conductive element having a cylindrical geometry. The first conductive element can be a hollow cylinder or a solid cylinder. The capacitor module also includes a second conductive element axially spaced from the first conductive element and of smaller axial extent. The second conductive element can be a flat disk, a dome, or a conductive tip at the end of a dielectric rod. A dielectric element is disposed between the first conductive element and the second conductive element. The system also includes a high voltage source having first and second terminals connected respectively to the first and second conductive elements. The high voltage source applies a high voltage to the conductive elements of sufficient value to create a thrust force on the module inducing movement thereof.

Official Gazette of the U.S. Patent and Trademark Office

*Asymmetry; Thrust; Cylindrical Bodies*



**20010125615** NASA Marshall Space Flight Center, Huntsville, AL USA

**Orbital Friction Stir Weld System**

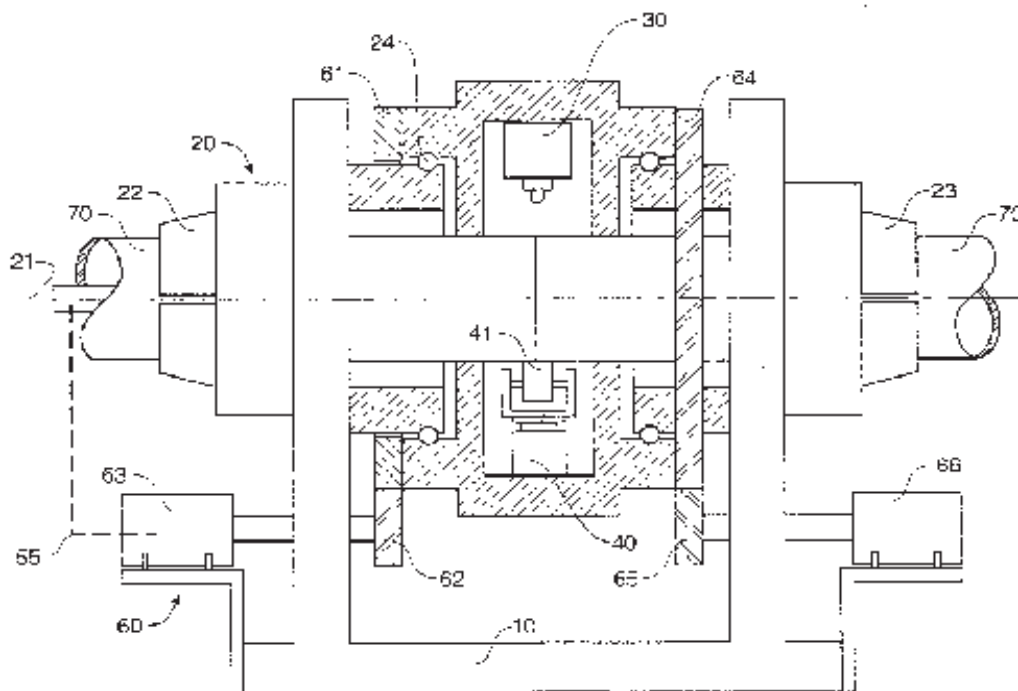
Ding, R. Jeffrey, Inventor, NASA Marshall Space Flight Center, USA; Carter, Robert W., Inventor, NASA Marshall Space Flight Center, USA; Jul. 10, 2001; 10p; In English

Patent Info.: Filed 18 Dec. 1998; NASA-Case-MFS-31269-1; US-Patent-6,269,052; US-Patent-Appl-SN-216484; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This invention is an apparatus for joining the ends of two cylindrical (i.e., pipe-shaped) sections together with a friction stir weld. The apparatus holds the two cylindrical sections together and provides back-side weld support as it makes a friction stir weld around the circumference of the joined ends.

Official Gazette of the U.S. Patent and Trademark Office

*Cylindrical Bodies; Friction; Welding Machines*



**20010125618** NASA Marshall Space Flight Center, Huntsville, AL USA

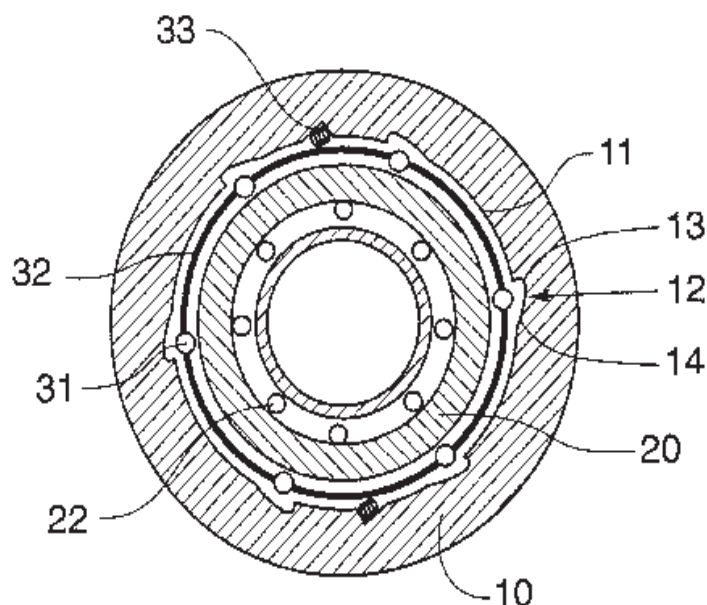
**Resealable Roller Clutch**

Myers, W. Neill, Inventor, NASA Marshall Space Flight Center, USA; Oct. 24, 2000; 10p; In English

Patent Info.: Filed 9 Dec. 1998; NASA-Case-MFS-31258; US-Patent-6,135,255; US-Patent-Appl-SN-207710; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A clutch that connects a first rotating member to a second rotating member in a manner that allows directional rotation between the two members in an engaged mode and free rotation between the members in a disengaged mode. The novelty of this

### Clutches; Rollers

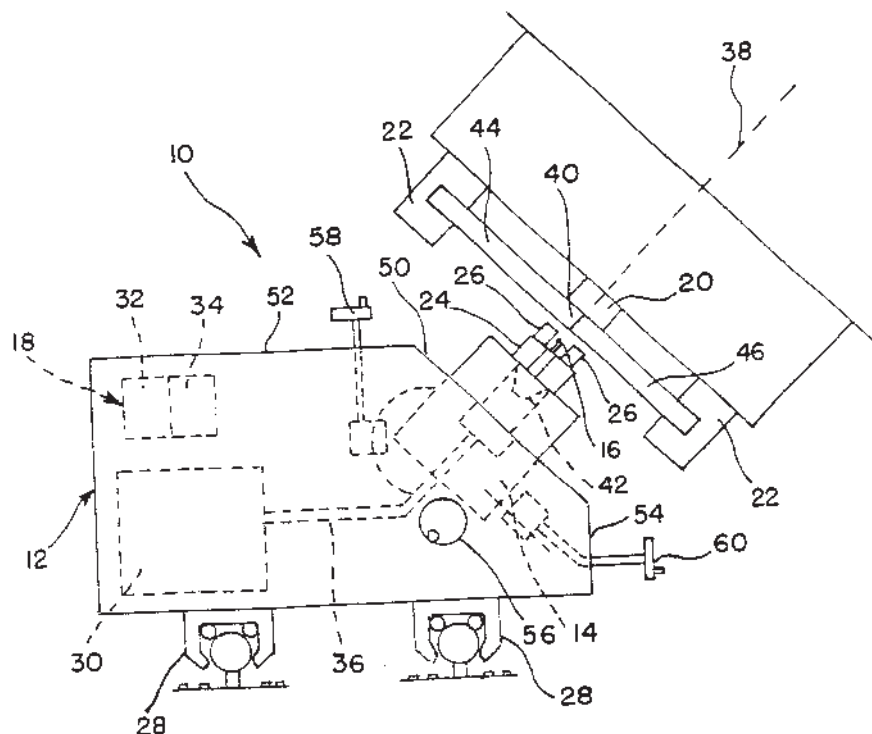


A friction stir weld system for welding and weld repair has a base foundation unit connected to a hydraulically controlled elevation platform and a hydraulically adjustable pin tool. The base foundation unit may be fixably connected to a horizontal surface or may be connected to a mobile support in order to provide mobility to the friction stir welding system. The elevation

platform may be utilized to raise and lower the adjustable pin tool about a particular axis. Additional components which may be necessary for the friction stir welding process include back plate tooling, fixturing and/or a roller mechanism.

Author

*Friction Welding; Hydraulic Control*



## 43

### EARTH RESOURCES AND REMOTE SENSING

*Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography. For instrumentation see 35 Instrumentation and Photography.*

**20010111076** NASA Langley Research Center, Hampton, VA USA

#### **Interfaces For Planning Vehicle Routes**

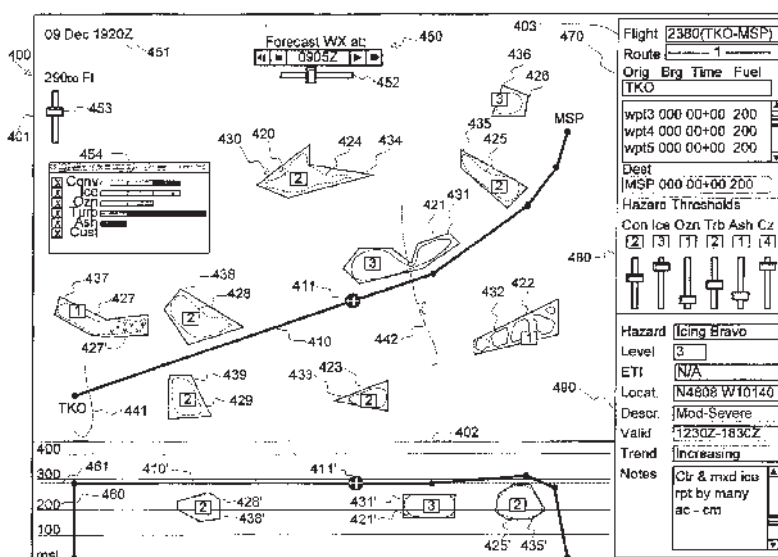
Feyereisen ,Thea Lynn, Inventor, NASA Langley Research Center, USA; Misiak, Christopher J., Inventor, NASA Langley Research Center, USA; Riley, Victor A., Inventor, NASA Langley Research Center, USA; Sep. 11, 2001; 9p; In English  
 Patent Info.: Filed 7 Oct. 1999; NASA-Case-LAR-15970-1; US-Patent-6,289,277; US-Patent-Appl-SN-413959; No Copyright;  
 Avail: CASI; A02, Hardcopy; A01, Microfiche

A system for producing vehicle routes such as aircraft flight plans in the presence of weather and other hazards defines static and moving hazards with polygons drawn on a display containing graphic hazard regions. Different hazard types and intensities

are displayed differently. Both lateral and vertical geographic depictions are displayed, and hazards can be displayed temporally as well. Users input information and thresholds for hazards.

Official Gazette of the U.S. Patent and Trademark Office

*Routes; Hazards; Flight Plans; Weather; Flight Conditions; Computer Systems Design*



## 52

### AEROSPACE MEDICINE

*Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.*

**20010094778** NASA Johnson Space Center, Houston, TX USA

#### Urine Preservative

Smith, Scott M., Inventor, NASA Johnson Space Center, USA; Nillen, Jeannie, Inventor, NASA Johnson Space Center, USA; Jul. 17, 2001; 4p; In English

Patent Info.: Filed 17 Dec. 1998; NASA-Case-MSC-22695-1; US-Patent-6,261,844; US-Patent-Appl-SN-213988; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Disclosed is CPG, a combination of a chlorhexidine salt (such as chlorhexidine digluconate, chlorhexidine diacetate, or chlorhexidine dichloride) and n-propyl gallate that can be used at ambient temperatures as a urine preservative.

Author

*Preservatives; Urine*

## 60

### COMPUTER OPERATIONS AND HARDWARE

*Includes hardware for computer graphics, firmware, and data processing. For components see 33 Electronics and Electrical Engineering.*

**20010096183** NASA Stennis Space Center, Bay Saint Louis, MS USA

#### Apparatus and Method for Effecting Data Transfer Between Data Systems

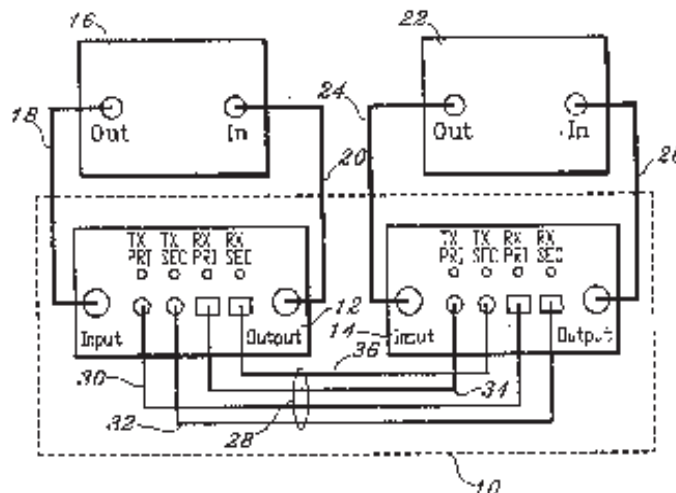
Kirkpatrick, Joey V., Inventor, NASA Stennis Space Center, USA; Grosz, Francis B., Jr., Inventor, NASA Stennis Space Center,

USA; Lannes, Kenny, Inventor, NASA Stennis Space Center, USA; Maniscalco, David G., Inventor, NASA Stennis Space Center, USA; Sep. 11, 2001; 16p; In English  
 Patent Info.: Filed 25 Mar. 1998; NASA-Case-SSC-00052; US-Patent-6,288,813; US-Patent-Appl-SN-047788; No Copyright;  
 Avail: CASI; A03, Hardcopy; A01, Microfiche

An apparatus for effecting data transfer between data systems comprising a first transceiver and a second transceiver. The first transceiver has an input for receiving digital data from one of the data systems, an output for serially outputting digital data to one of the data systems, at least one transmitter for converting digital data received at the input into optical signals, and at least one receiver for receiving optical signals and serially converting the received optical signals to digital data for output to the data output. The second transceiver has an input for receiving digital data from another one of the data systems, an output for serially outputting digital data to the another one of the data systems, at least one transmitter for serially converting digital data received at the input of the second transceiver into optical signals, and at least one receiver for receiving optical signals and serially converting the received optical signals to digital data for output to the output of the second transceiver. The apparatus further comprises an optical link connecting the first and second transceivers. The optical link comprising a pair of optical fibers. One of the optical fibers optically links the transmitter of the first transceiver to the receiver of the second transceiver. The other optical fiber optically links the receiver of the first transceiver to the transmitter of the second transceiver.

Official Gazette of the U.S. Patent and Trademark Office

*Data Systems; Digital Data; Transmitter Receivers; Data Transfer (Computers)*



## 63 CYBERNETICS

*Includes feedback and control theory, artificial intelligence, robotics and expert systems. For related information see also 54 Man/System Technology and Life Support., Artificial Intelligence and Robotics*

**20010096119** NASA Johnson Space Center, Houston, TX USA

### **Compact Dexterous Robotic Hand**

Lovchik, Christopher Scott, Inventor, NASA Johnson Space Center, USA; Diftler, Myron A., Inventor, NASA Johnson Space Center, USA; Jun. 12, 2001; 28p; In English

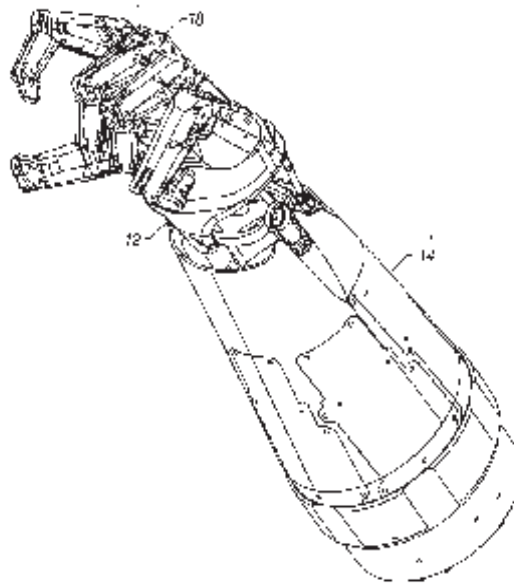
Patent Info.: Filed 25 Jan. 1999; NASA-Case-MS-22883-1; US-Patent-6,244,644; US-Patent-Appl-SN-236965; No Copyright;  
 Avail: CASI; A03, Hardcopy; A01, Microfiche

A compact robotic hand includes a palm housing, a wrist section, and a forearm section. The palm housing supports a plurality of fingers and one or more movable palm members that cooperate with the fingers to grasp and/or release an object. Each flexible finger comprises a plurality of hingedly connected segments, including a proximal segment pivotally connected to the palm housing. The proximal finger segment includes at least one groove defining first and second cam surfaces for engagement with a cable. A plurality of lead screw assemblies each carried by the palm housing are supplied with power from a flexible shaft rotated

by an actuator and output linear motion to a cable move a finger. The cable is secured within a respective groove and enables each finger to move between an opened and closed position. A decoupling assembly pivotally connected to a proximal finger segment enables a cable connected thereto to control movement of an intermediate and distal finger segment independent of movement of the proximal finger segment. The dexterous robotic hand closely resembles the function of a human hand yet is light weight and capable of grasping both heavy and light objects with a high degree of precision.

Official Gazette of the U.S. Patent and Trademark Office

*Robot Arms; Robotics; Manipulators*



64

## NUMERICAL ANALYSIS

*Includes iteration, difference equations, and numerical approximation.*

**20010095542** NASA Dryden Flight Research Center, Edwards, CA USA

### **Stable Algorithm For Estimating Airdata From Flush Surface Pressure Measurements**

Whitmore, Stephen, A., Inventor, NASA Dryden Flight Research Center, USA; Cobleigh, Brent R., Inventor, NASA Dryden Flight Research Center, USA; Haering, Edward A., Jr., Inventor, NASA Dryden Flight Research Center, USA; Jun. 26, 2001; 22p; In English

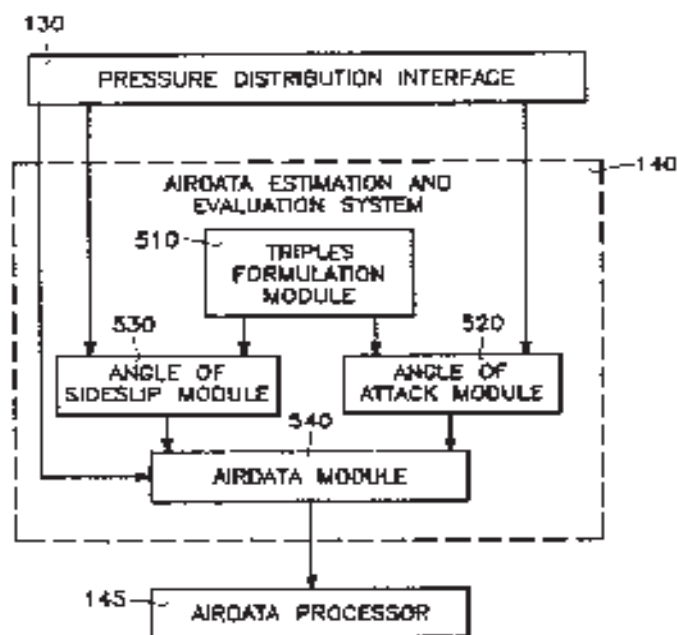
Patent Info.: Filed 5 Oct. 1998; NASA-Case-DRC-98022; US-Patent-6,253,166; US-Patent-Appl-SN-173608; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An airdata estimation and evaluation system and method, including a stable algorithm for estimating airdata from nonintrusive surface pressure measurements. The airdata estimation and evaluation system is preferably implemented in a flush airdata sensing (FADS) system. The system and method of the present invention take a flow model equation and transform it into a triples formulation equation. The triples formulation equation eliminates the pressure related states from the flow model equation

by strategically taking the differences of three surface pressures, known as triples. This triples formulation equation is then used to accurately estimate and compute vital airdata from nonintrusive surface pressure measurements.

Official Gazette of the U.S. Patent and Trademark Office

*Algorithms; Pressure Measurement; Flow Measurement*



## 74 OPTICS

*Includes light phenomena; and optical devices. For lasers see 36 Lasers and Masers.*

**20010110767** NASA Goddard Space Flight Center, Greenbelt, MD USA

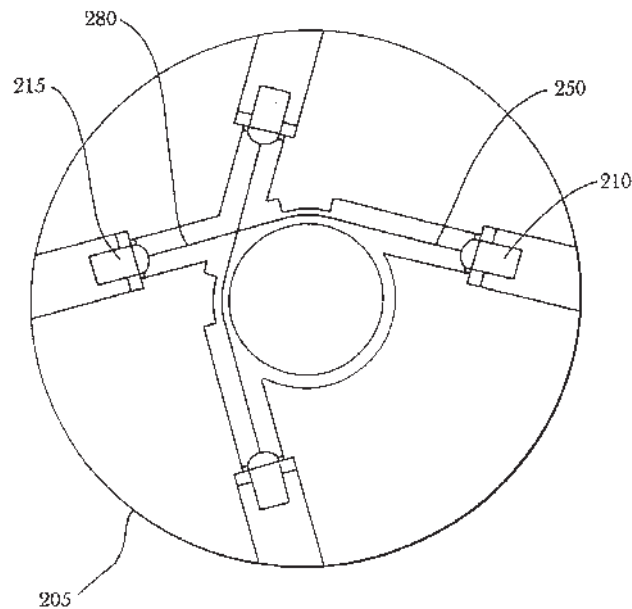
### **Shaft Position Optical Sensor**

Blumenstock, Kenneth A., Inventor, NASA Goddard Space Flight Center, USA; Hakum, Claef F., Inventor, NASA Goddard Space Flight Center, USA; Johnson, Clarence S., Inventor, NASA Goddard Space Flight Center, USA; Jan. 23, 2001; 10p; In English; Provisional application of US-Patent-Appl-SN-097083, filed 19 Aug. 1998

Patent Info.: Filed 19 Aug. 1999; NASA-Case-GSC-13988-3; US-Patent-6,177,997; US-Patent-Appl-SN-376000; US-Patent-Appl-SN-097083; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The present invention is an optical sensor that senses the movement of a shaft. Detection of radial movement is made when a portion of light incident on the shaft sensor-target is blocked. For detection of axial movement, a disk with flat surface is mounted and used to block a portion of light. The variation in the amount of light allowed to pass through is a measure of the position of the shaft. As proposed by this invention, significant improvement is made with respect to sensitivity and linearity of the system

when the light is permanently partially blocked. to accomplish this goal this invention adds a boss to the system. to eliminate possible drift of system performance due to LED degradation or temperature variation, a feedback feature is added to the system.  
 Official Gazette of the U.S. Patent and Trademark Office  
*Optical Measuring Instruments; Shafts (Machine Elements); Detection*



**20010110770** NASA Goddard Space Flight Center, Greenbelt, MD USA

**Adhesive Bubble Removal Method and Apparatus for Fiber Optic Applications**

Kolasinski, John R., Inventor, NASA Goddard Space Flight Center, USA; Sep. 11, 2001; 8p; In English

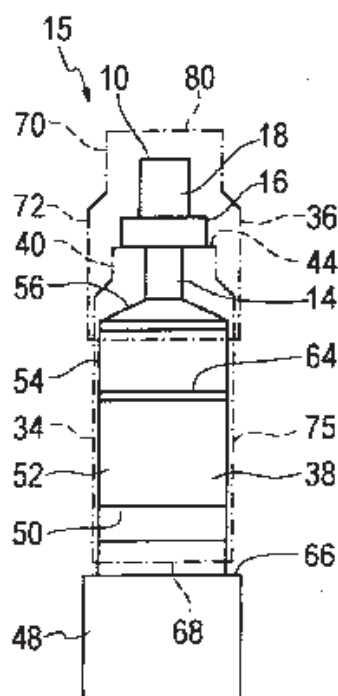
Patent Info.: Filed 13 Dec. 1999; NASA-Case-GSC-13874-1; US-Patent-6,287,404; US-Patent-Appl-SN-459473; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An assembly for supporting a fiber optic termination or connector in a centrifuge and comprising a cylindrical body member having a top portion adapted to receive the ferrule body portion of a fiber optic termination or connector and a bottom portion for receiving a cylindrical piston/sealing unit is presented. The piston portion of the piston/sealing unit includes a compressible tip which is adapted to butt up against the outer end of the ferrule body portion of the fiber optic termination or connector. A cylindrical end cap fits over the upper end of the body member for holding the fiber optic termination in place on the body member and causing a seal to be formed between the termination or connector and the upper portion of the body member adjacent the

compressible tip of the plunger. The parts, when fitted together, are placed in a centrifuge which is operated for a predetermined spin cycle, so as to cause any bubbles in the uncured liquid adhesive to be vented outwardly from the termination through the end cap. Subsequent removal of the fiber optic termination or connector from the centrifuge and assembly is "bubble free" and ready to be joined with an optical fiber which is inserted in the ferrule end of the termination or connector.

Official Gazette of the U.S. Patent and Trademark Office

*Adhesives; Fiber Optics; Bubbles; Centrifuges*



82

## DOCUMENTATION AND INFORMATION SCIENCE

*Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer documentation see 61 Computer Programming and Software.*

**20010110773** NASA Ames Research Center, Moffett Field, CA USA

### **Real-Time Surface Traffic Adviser**

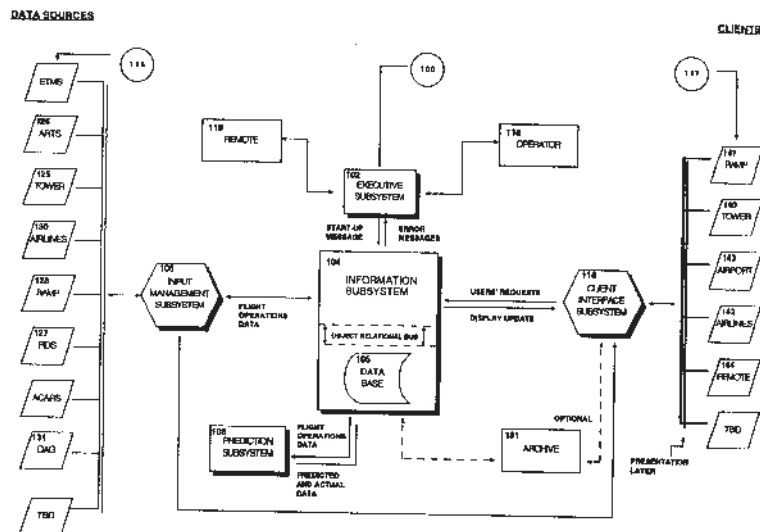
Glass, Brian J., Inventor, NASA Ames Research Center, USA; Spirkovska, Liljana, Inventor, NASA Ames Research Center, USA; McDermott, William J., Inventor, NASA Ames Research Center, USA; Reisman, Ronald J., Inventor, NASA Ames Research Center, USA; Gibson, James, Inventor, NASA Ames Research Center, USA; Iverson, David L., Inventor, NASA Ames Research Center, USA; Aug. 21, 2001; 60p; In English; Continuation-in-part of US-Patent-Appl-SN-090812, filed 4 Jun. 1998 Patent Info.: Filed 10 Aug. 1998; NASA-Case-ARC-14268-2; US-Patent-6,278,965; US-Patent-Appl-SN-131560; US-Patent-Appl-SN-090812; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A real-time data management system which uses data generated at different rates by multiple heterogeneous incompatible data sources are presented. In one embodiment, the invention is as an airport surface traffic data management system (traffic adviser) that electronically interconnects air traffic control, airline, and airport operations user communities to facilitate information sharing and improve taxi queuing. The system uses an expert system to fuse data from a variety of airline, airport

operations, ramp control, and air traffic control sources, in order to establish, predict, and update reference data values for every aircraft surface operation.

Official Gazette of the U.S. Patent and Trademark Office

*Real Time Operation; Air Traffic Control; Data Management; Airports*



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# PATENT LICENSING REGULATIONS

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION 14 CFR Part 1245

### Patents and Other Intellectual Property Rights

**AGENCY:** National Aeronautics and Space Administration (NASA).

**Action:** Final rule.

**SUMMARY:** NASA is amending 14 CFR Part 1245 by removing Subpart 2, "Licensing of NASA Inventions." The Department of Commerce has issued similar regulations which prescribe the terms, conditions, and procedures upon which a federally-owned invention may be licensed. These regulations are codified at 37 CFR Part 404, "*Licensing of Government Owned Inventions*." NASA began granting licenses in accordance with the Department of Commerce regulations on March 13, 1995. All licenses agreements executed prior to this date will operate under the previous regulations.

**EFFECTIVE DATE:** March 13, 1995.

#### FOR FURTHER INFORMATION CONTACT:

John G. Mannix, (202) 358-2424.

#### List of Subjects in 14 CFR Part 1245

Authority delegations (Government agencies), Inventions and patents.

Under the authority, 42 U.S.C. 2473, 14 CFR Part 1245 is amended as follows:

#### PART 1245 — [AMENDED]

##### Subpart 2 — [Removed and Reserved]

In 14 CFR Part 1245, Subpart 2 (consisting of SS 1245.200 through 1245.214) is removed and reserved.

Dated: April 24, 1995.

**Edward A. Frankle,**  
General Counsel.

[FR Doc. 95 10583 Filed 4-28-95, 8:45 am]

**BILLING CODE 7510 01 M**

## Code of Federal Regulations 37 CFR Part 404 Licensing of Government Owned Inventions

### Sec.

- 404.1 Scope of part.
- 404.2 Policy and objective.
- 404.3 Definitions.
- 404.4 Authority to grant licenses.
- 404.5 Restrictions and conditions on all licenses granted under this part.
- 404.6 Nonexclusive licenses.
- 404.7 Exclusive and partially exclusive licenses.
- 404.8 Application for a license.
- 404.9 Notice to Attorney General.
- 404.10 Modification and termination of licenses.
- 404.11 Appeals.
- 404.12 Protection and administration of inventions.
- 404.13 Transfer of custody.
- 404.14 Confidentiality of information.

### Sec. 404.1 Scope of part.

This part prescribes the terms, conditions, and procedures upon which a federally owned invention, other than an invention in the custody of the Tennessee Valley Authority, may be licensed. It supersedes the regulations at 41 CFR Subpart 101-4.1. This part does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

### Sec. 404.2 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from federally supported research or development.

### Sec. 404.3 Definitions.

(a) '*Federally owned invention*' means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) '*Federal agency*' means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a federally owned invention.

(c) '*Small business firm*' means a small business concern as defined in section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration.

(d) '*Practical application*' means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(e) '*United States*' means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

### Sec. 404.4 Authority to grant licenses.

Federally owned inventions shall be made available for licensing as deemed appropriate in the public interest. Federal agencies having custody of federally owned inventions may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this part.

### Sec. 404.5 Restrictions and conditions on all licenses granted under this part.

(a) (1) A license may be granted only if the applicant has supplied the Federal agency with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a federally owned invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) Licenses shall contain such terms and conditions as the Federal agency determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this part. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement unless sooner terminated in accordance with this part.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of the Federal agency, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The licensee may provide the license the right to grant sublicenses under the license, subject to the approval of the Federal agency. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to the Federal agency.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) Licenses may be royalty-free or for royalties or other consideration.

(8) Where an agreement is obtained pursuant to Sec. 404.5(a) (2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of the Federal agency to terminate the license, in whole or in part, if:

(i) The Federal agency determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of the Federal agency that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) The Federal agency determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this part, upon mutual agreement of the Federal agency and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this part shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

#### **Sec. 404.6 Nonexclusive licenses.**

(a) Nonexclusive licenses may be granted under federally owned inventions without publication of availability or notice of a prospective license.

(b) In addition to the provisions of Sec. 404.5, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, the Federal agency may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

#### **Sec. 404.7 Exclusive and partially exclusive licenses.**

(a) (1) Exclusive or partially exclusive domestic licenses may be granted on federally owned inventions three months after notice of the invention's availability has been announced in the Federal Register, or without such notice where the Federal agency determines that expeditious granting of such a license will best serve the interest of the Federal Government and the public; and in either situation, only if;

(i) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60-day period;

(ii) After expiration of the period in Sec. 404.7(a)(1)(i) and consideration of any written objections received during the period, the Federal agency has determined that;

(A) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(B) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(C) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(D) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(iii) The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(iv) The Federal agency has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) In addition to the provisions of Sec. 404.5, the following terms and conditions apply to domestic exclusive and partially exclusive licenses;

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to the Federal agency the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) (1) Exclusive or partially exclusive licenses may be granted on a federally owned invention covered by a foreign patent, patent application, or other form of protection, provided that;

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) The agency has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) In addition to the provisions of Sec. 404.5 the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) Federal agencies shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

#### **Sec. 404.8 Application for a license.**

An application for a license should be addressed to the Federal agency having custody of the invention and shall normally include:

(a) Identification of the invention for which the license is desired including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of the representative of the applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether the applicant is a small business firm as defined in Sec. 404.3(c)

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

#### **Sec. 404.9 Notice to Attorney General.**

A copy of the notice provided for in Sec. 404.7(a)(1)(i) and (b)(1)(i) will be sent to the Attorney General.

#### **Sec. 404.10 Modification and termination of licenses.**

Before modifying or terminating a license, other than by mutual agreement, the Federal agency shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license shall not be modified or terminated.

#### **Sec. 404.11 Appeals.**

In accordance with procedures prescribed by the Federal agency, the following parties may appeal to the agency head or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(a) A person whose application for a license has been denied.

(b) A licensee whose license has been modified or terminated, in whole or in part; or

(c) A person who timely filed a written objection in response to the notice required by Sec. 404.7(a)(1)(i) or Sec. 404.7(b)(1)(i) and who can demonstrate to the satisfaction of the Federal agency that such person may be damaged by the agency action.

#### **Sec. 404.12 Protection and administration of inventions.**

A Federal agency may take any suitable and necessary steps to protect and administer rights to federally owned inventions, either directly or through contract.

#### **Sec. 404.13 Transfer of custody.**

A Federal agency having custody of a federally owned invention may transfer custody and administration, in whole or in part, to another Federal agency, of the right, title, or interest in such invention.

#### **Sec. 404.14 Confidentiality of information.**

Title 35, United States Code, section 209, provides that any plan submitted pursuant to Sec. 404.8 (h) and any report required by Sec. 404.5(b)(6) may be treated by the Federal agency as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

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